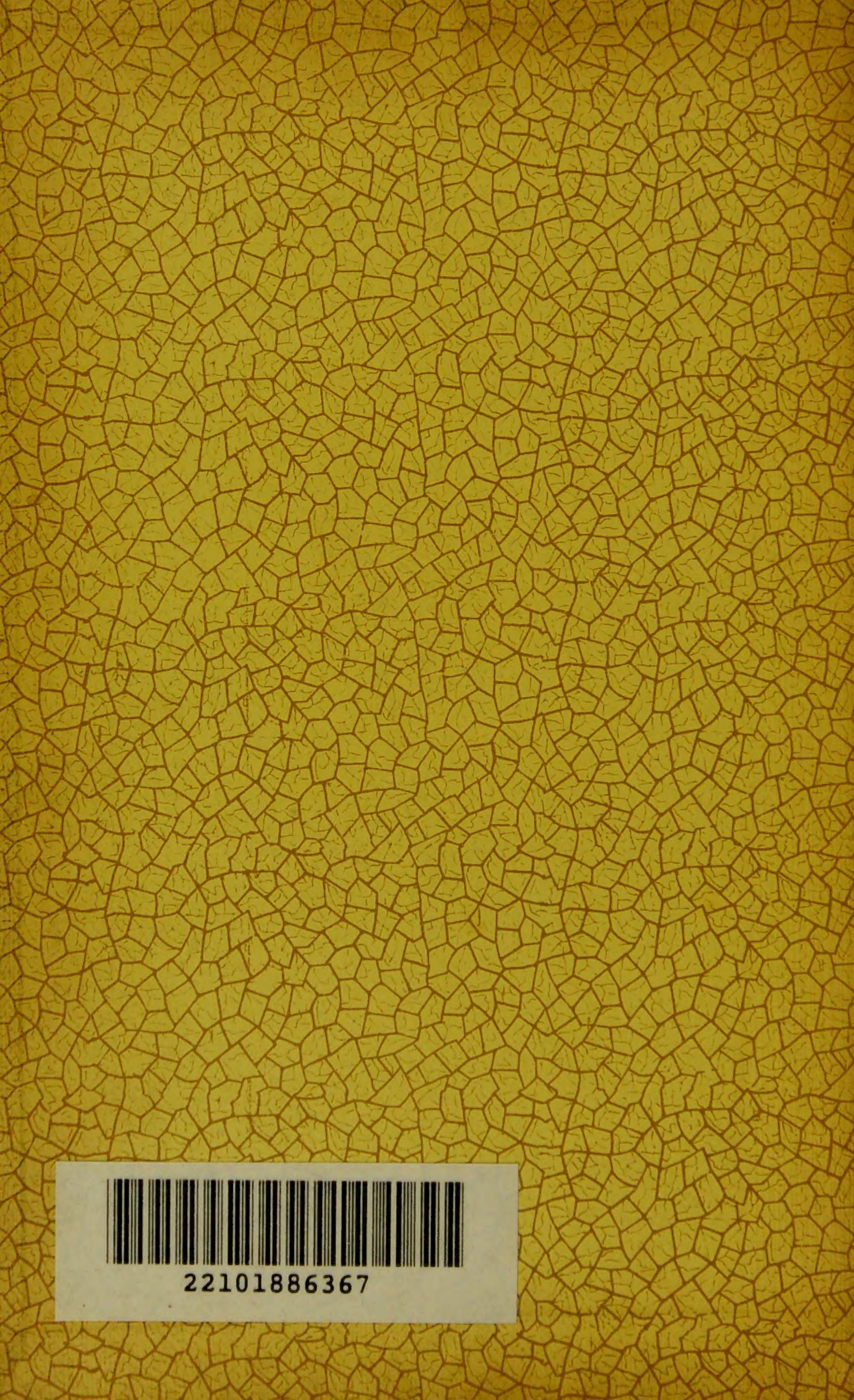
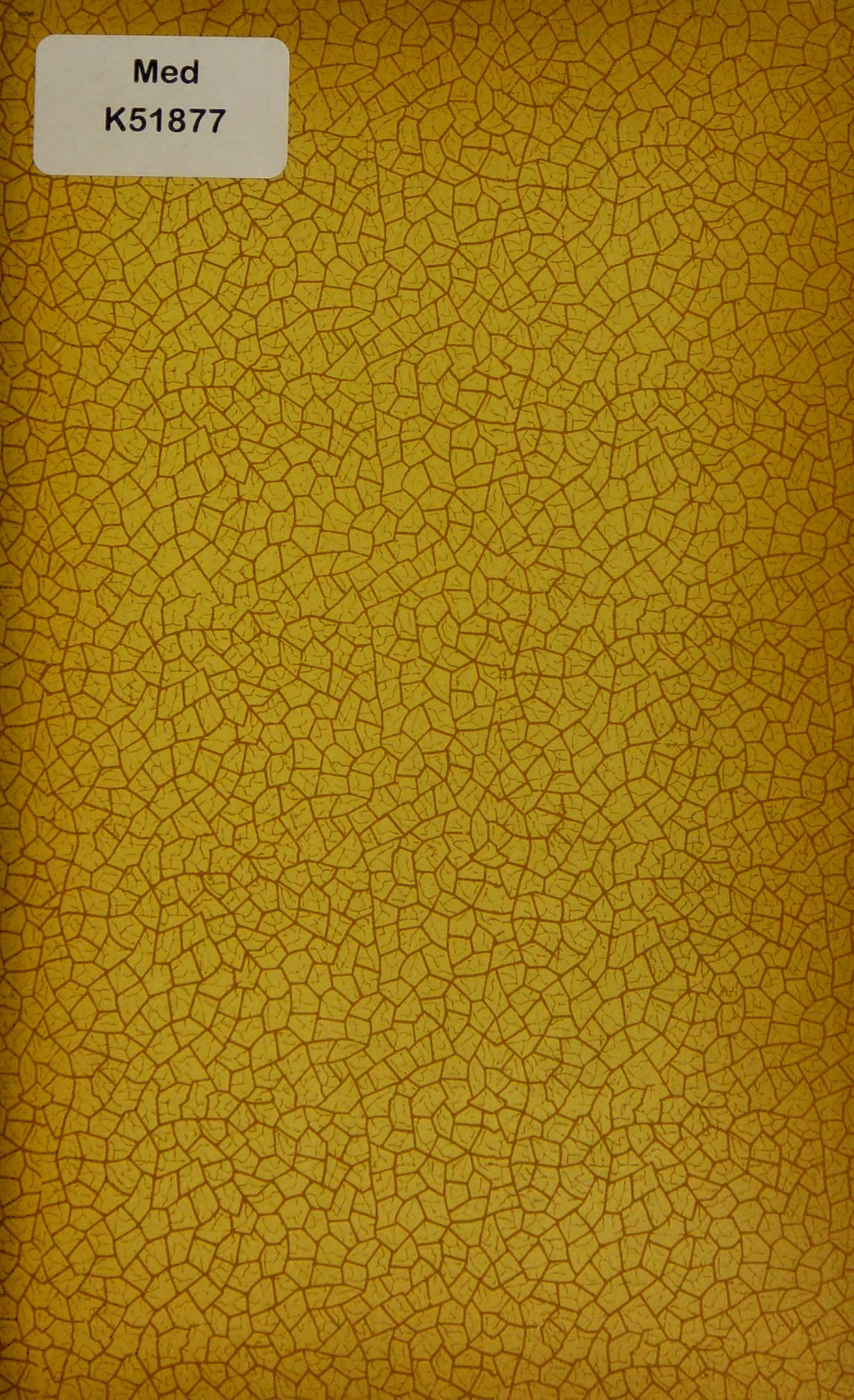
THE GAITS, EXTERIOR AND PROPORTIONS OF THE HORSE

DUHOUSSET.

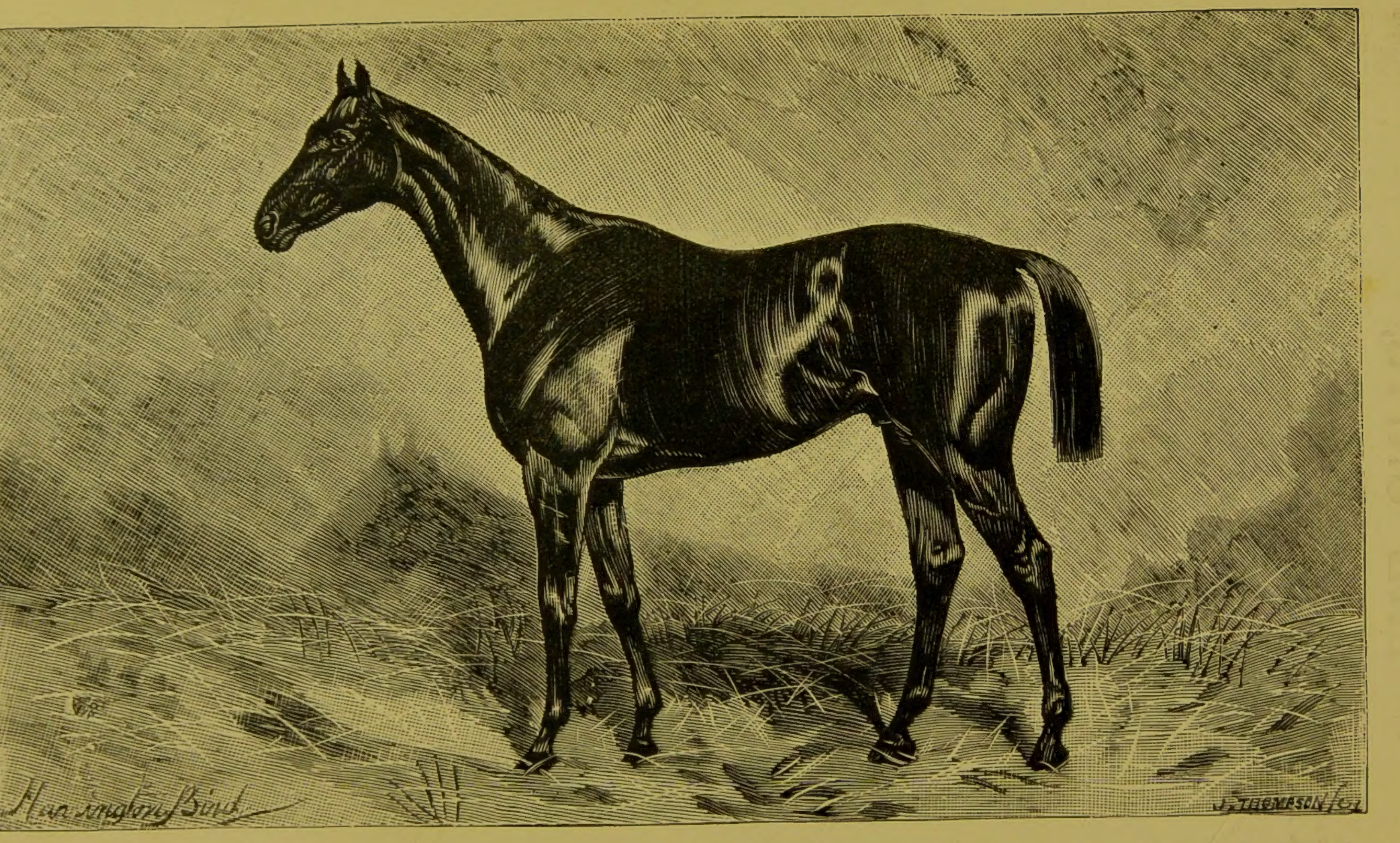

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THE HORSE.

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From the original, by Harrington Bird.] [*Painted expressly for this work.*

LADAS.

"THE MOST ELEGANT OF RACE-HORSES."

THE GAITS,

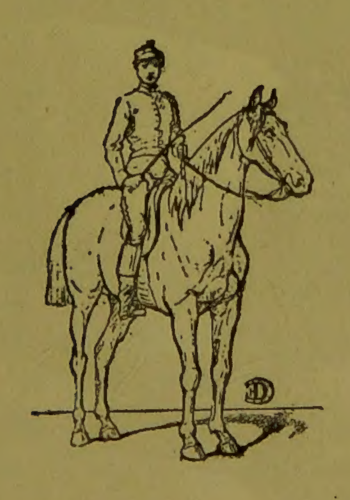
EXTERIOR AND PROPORTIONS

OF

THE HORSE

BY

Lt.-COLONEL E. DUHOUSSET.



TRANSLATED FROM THE FRENCH.

LONDON:
PERCY YOUNG, 137, GOWER STREET, W.C.
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PREFACE.

A PERIODICAL specially devoted to hippology commissioned me, a few years since, to give an account, from an artistic point of view, of the pictures in recent exhibitions, which had contained portrayals of horses. Addressing those who love horses and conscientious artists, I had frequent occasion to deplore the carelessness with which the reproduction of these animals was made, in flagrant violation of the most elementary rules of their locomotion, of the proportions within the limitations of which they must live, as well as of the statistical knowledge, in the absence of which it is impossible to impart animation to them.

Having long since been impressed by this great gulf in an instruction so useful for the exact reproduction of the form and the accurate rendering of the motion, my observations were concentrated upon the different breeds of horses, more especially the Arab, which horse is permitted to develop itself in the open air. Circumstances peculiarly favoured me, as I was compelled to spend a number of the years of a very active existence in the East, where one may be said to live on horseback.

I spoke to the professors of l'Ecole des Beaux Arts, and to various talented artists, of my project of publishing under the form of advice, the information which was fundamentally based upon a large number of comparative mensurations made abroad.

I will here insert two letters in response to the explanation of my work, as well as to my observations upon the study of the horse.

The one is from the artist Gerome, with the work of whose conscientious pencil all are familiar.

"My dear Colonel,

For the propagation of a useful and rigorously exact work of instruction, the enunciation of it will not suffice; it must be written.

After having widely travelled, seen much and observed much, I believe you will be rendering a genuine service to artists, if you will collect, in a volume written for their special benefit, the summary of the specialized knowledge you possess of the gaits, habits, and exterior of the horse.

I have often been able to appreciate this practical aspect of your remarks, as well as the justice of your observations upon the hippic representations in the recent Salons. I am under no self-imposed illusion about the dryness of the work which I advise, as well as of the absolutely necessary inclusion of numerous explanatory plates; but I know to whom I am writing. You will not recoil from a conscientious work, undertaken with so useful an object, and for which all engaged in the study of the horse will be grateful to you.

Your very sincere friend,
J. L. Gèrome."

The other is from the sculptor Guillaume, then director of l'Ecole des Beaux Arts :—

"My dear Colonel,

We have so often discussed your studies upon horses, and your observations have always appeared to me so accurate and of so great an utility for artists that I shall be charmed to see you publish them. In this it will be impossible for me to give you too much encouragement, so convinced am I of the benefit I shall derive from your labours, and of the profit which others, like myself, will thence obtain.

From the aspect of tuition, which is the especial subject absorbing my thoughts, I shall be glad to see the publication of a work intended to wage war against the empiricism which still exerts almost absolute sway in that important branch of study which has to do with the horse.

I am not of the opinion of those who believe that, in Art, one should be contented with the semblance. No doubt in the delicate instance of the gaits, for example, the truth cannot invariably appear probable, the man of taste must pause opportunely. But it may be affirmed that the conditions of absolute probability may generally be found in the truth.

Therefore, take courage. Believe in my sympathy and in my affectionate sentiments.

Eugene Guillaume."

Encouraged by men of a competency so recognised, I have commenced the editing of my notes. They first appeared in the "Moniteur de l'élevage du cheval de service," subsequently in a pamphlet.

Some time after the publication of the first edition of the "Studies upon the Horse," of which the preceding kind letters formed the preface, several artists did me the honour of coming to consult me, and I had to complete, in improvised conferences, the chapters the reunion of

which *in fascicula* had been only a succinct epitome, by giving more elaborate explanations with the aid of demonstrations either at horse shows or in the manege.

In spite of the encouragement I was perpetually receiving, I nevertheless hesitated to reissue the slender work, the edition of which was exhausted. The insistance of many workers who were interested in these hippic studies, and the following letter from Dr. Marey (member of the Institute), whose singular experiments upon the gaits of animals have acquired high scientific value, induced me to revise my first publication for the purpose of adding more detailed observations, as well as new explanatory drawings.

"My dear Colonel,

Much has been said of the mutual co-operation which art and science should lend one another for the perfection of each; but to effect this reconciliation, it was necessary to unite, as you have done, practical knowledge to powers of execution of such kind as your first work afforded us proof.

Give a series of plates in which the truth of the attitudes of the horse in motion be united to correctness of form, and you will render a great service to artists.

Certain masters have already, in this matter, done something to improve the taste of the public; consummate this instruction and soon neither convention nor caprice will be accepted. Great success to you, dear Colonel, and believe in my affectionate devotion.

Marey."

I shall exert myself to the utmost in response to the over-indulgent opinion of the learned professors; and, in the hope of being of use to all who love and observe horses, I am happy to dedicate to them a more complete study than the first.

E. Duhousset.

STUDIES

ON

THE GAITS, EXTERIOR,

AND

PROPORTIONS OF THE HORSE.

CHAPTER I.

INTRODUCTION.

THE man who busies himself about art, ought never to evoke in the mind of the spectator an inaccurate recollection for which he will remain responsible.

If I have been able, after a long course of observations upon horses, to give some useful information to those who love them and busy themselves about them; and after I have confronted the aridity of a mathematical treatise by measuring a very great number of these animals, both in Asia and Africa, where they live in the manner most conformable to their nature, I can affirm that a measurement on a living animal is never *strictly* applicable, any more than a perfectly regular movement is produced by a consistent manner. I am therefore far from advising the geometrical construction of the horse.

My sole aim is to forewarn artists against the ridiculous mobility of limbs and the fantastic dislocations, detrimental alike to the vitality and the action, which custom perpetually imposes upon animals as the translation of the most simple gaits.

I am not ignoring the fact that the unchecked reproduction of a defective attitude, conventionally accepted for many years, is more easy; but, in the instance of the horse, I do not believe that, at our epoch, contentment should be permissible at the following reply, frequently made to me:—"What does the theory of animal locomotion matter? The sculptor and artist adopt what the public, the principal judge, is accustomed to accept as movement. The artist portrays a horse which appears to walk, and that suffices him."

This brings us back to the admission that we shall always rest under the influence of the not very consolatory phrase of the American philosopher, Emerson:—"The public above all else demands conformity. It has little affection for realities, but much for conventions and customs."

Therefore, it is the public who must be enlightened, since it is they who see and observe.

So far as all connected with the representation of animals is concerned, everything has remained stationary for a long time past. Custom recapitulated the vitality of movement in certain positions of the members, convention compelling the draughtsman to confine himself within the limitations of this restricted animation. Now progress in this respect must be pointed out. Some have even attained to the mathematical observation of the gaits.

Dr. Marey, quite recently, in a lecture at the Sorbonne, detailed to his auditors experiments made upon the gaits of the horse. The learned physiologist who has succeeded in the circumscription of the rhythm of the imprints in a graphic notation, affirmed that the artists who, at the present day, make such laudable endeavours to correctly delineate the horse, can derive great benefit from a process which offers the double advantage of representing the gaits with exactitude, as well as the numerous variations of outline.

This would be a valuable expedient for truthful representations; for imperfection in art is not solely dependent upon errors which may be committed, as often an artist, when acquainted with an attitude which to him appears exact, repeats it with lamentable monotony.

To select examples which are of recent date, Parrocel, Van der Meulen, Carl Vernet, etc., etc., in pictures of very great merit, perpetually falsified truth. When they represented hunters or chargers galloping, the animal rises vigorously, with the anterior members equally bent, the much inclined posterior still adhering to the ground it is about to quit, by the pressure, with a single effort, of the point of the toes of the two hind legs.

The artist must have possessed great resolution, who first broke with this routine that approached the prance and leap, which have come down to our day from the old masters, but prove absolutely inadequate for the action, the expression of which is desired.

Till now, it was permissible to urge the difficulty of undeniably proving a rapid and high gait by analysis. After the recent experiments, the results of which are here detailed, there is no longer room for doubt. Henceforth, the limitations within which his imagination may select a truthful attitude, can be indicated with certitude to him who is desirous of portraying the interesting animal now engaging our attention.

Every composition representing the horse, from the calmest station to that of celerity strained to the utmost intensity, is an accessory, the mechanical function of which requires exactitude. In a word, the animal must *live* before being animated. Once this be admitted, nothing can be better than to control this exterior life so as to give the expression of the conception by an intelligent animation.

Why should not the movements of animals be studied as effectively as those of men—not in the studio, to which they are unadapted, but by becoming acquainted with the laws which direct them—in order to work with freedom and to deserve the reliance which the spectator places in the signer of the work of art?

A skilled riding master and learned professor, M. Raabe, has several times given public lectures which afforded full explanation to such sculptors and artists as desired to instruct themselves. It is regrettable that such special tuition is not further popularized.

When requiring knowledge of the muscles and of the natural attitudes of animals, I do not pretend that it is

necessary to draw a detailed myology of oxen grazing or horses ploughing, any more than to make skeletons to show us carriage horses and race horses.

These skeletons and anatomical drawings can only represent the corpse, the inert mass, and we need the living animal, unencumbered by the pedantry of exaggerated minuteness or the exhibition of erroneous knowledge. It is, however, only just that the public, which is now rather better informed, should demand a sufficiently serious study of what is presented to it, and should decline to accept animals absolutely invented.

Far be it from me to desire from the painter the crudity of the naturalist or a too serious examination of the horse in position. The thorough and too rigorous study of the perpendicular is only immobility in an unnatural station. The artist can intelligently utilise it for the truth of a movement without the need of satisfying his imagination leading him on to inacceptable negligence in undue modification of the form.

All types are not to be found in nature. It is then that thought adds its complement by idealising the model. The animal not wearing the expression desired by the artist, the draughtsman must compose this movement after a fugitive impression, which analysis will reconstruct faithfully, if he be well taught, with energy and warmth if he be cunning in his art, for he will then animate his subject, rendering it handsome and elegant, while his composition will be picturesque, even while remaining absolutely truthful.

But for the labour to be productive of good, a thorough knowledge of the subject is essential, simply as material to be worked upon. Never undertake it with the least dilatoriness. Hesitation in this direction is a weariness which weightens and impairs the effect of the first sketch. Meditate long over your composition, but in practice interpret your conception with rapidity.

The artist should therefore be learned, well acquainted with the contour of forms, and possessed of an intimate knowledge of details, so that the recollection mentally evoked may find its proper situation. This is of the utmost necessity, in order that the original and ensemble conception may predominate in the composition.

If you have previously studied with attention, be not in the least troubled about details when you are sketching in the outlines. Your memory will give due interpretation, and the doubt, which would hinder you in the reverse situation, will soon vanish, and instead, will impart to your pencil the boldness of accurate delineation with all due preservation of style ; that is to say, passing boldly from the form to the idea.

From this I conclude that, for the artist, *truth* is the result of constant study of the living model. *Art* is the utilisation of this imperatively necessitated study, prior to the animation of the model in a picturesque manner, according to the impression conveyed by the senses and the instinct of the animal.

In the case of the horse, the interpretation of the phases of motion are very difficult, however thorough the knowledge of the exterior of the subject for reproduction. It is therefore necessary to know what takes place in nature. The spectator should understand that the action of the animal is taken from its real life.

Let me be permitted to relate a little episode, already long past, which has relation to the present theme. I met, in the studio of Horace Vernet, a rich amateur who was in ecstacies over the artist's facility in the accurate and rapid reproduction of the gaits of horses. The painter, moved by these compliments, and in order to give pleasure to his guest, covered a canvas, as if by magic, with the most irregular motions of the equine tribe ; racing, rearing, kicking. The rapid pencil of Vernet animated all alike, and when the stranger had taken his leave, astounded at such prolific ability, Vernet said to me, whilst making a cigarette, "I have done my business, but I took care to avoid bringing back at a quiet pace all those animals which I had just started at full speed to gratify him ; he would perhaps have noticed the hesitation which I feel at portraying the simplicity of a tranquil gait, for then my eye loses command. Nevertheless," he added, "I think I have improved upon the reproduction of my father's time."

I have always recollected this feeling of hesitation in the great painter, who possessed every artistic audacity.

In order that the outlines of details may be exact, the

artist must know the situation of the bones, the muscles which protrude under the skin, as well as the attachments, and must also have studied the form of these muscles in *repose*, in *support*, and in *appui*. It is more especially upon these different periods of movement that I shall dilate in the course of this work, as I have noticed they form the great gap in the artistic education of the period.

It is absolutely essential that the cause of realism in the portrayal of horses, as here preconceived, should win numerous converts, despite the opposition it produces. I believe encouragement may be found in the marked tendency towards accuracy in the pictures at recent exhibitions.

Modern painters long gave an erroneous interpretation, with which custom made them satisfied. Now this no longer suffices ; there is a desire to learn, and, happily, real progress is undeniably visible.

Already the spectator feels less astonishment at, and considers with interest, attitudes which until now have been too unfamiliar to his eye. I am alluding to the form and calm gaits of animals, which the public should be forced to accept as accurate and not as a speciality, appreciated by a few individuals. Upon this, also, truth ought to shed light, and impose its beneficent rule upon all without fear of injuring the routine.

For some years past, many young painters appear to have undertaken the enterprise of drawing the horse, with the object of truthfully portraying it, after numerous preliminary studies.

Now we have the proof. More and more clearly may be discerned the study of proportions, and of forms modified with exactitude by movement. Let us hope that this cause is destined to make rapid progress, in spite of those who resist what they are, too lightly, pleased to term *innovations*.

To make *innovations* in Art is to draw down upon oneself the reproaches of the crowd which swells the number of the detractors. These latter, when not more witty than learned, fight with the single force of the inertia of their ignorance, based upon the errors of their elders.

It is this that we shall not cease to attack, and it can

be the more effectually combated, because we have in our ranks painters of a justly recognised celebrity, who will respond to our ungrateful rôle of observer, by reason of the difficulties they themselves experience, in order to submit themselves to the sustained attention, relying upon the resumé of our experiences.

In affirmation of the need of the varied attainments I have just enumerated, it will suffice if I appeal to the conscientious and persistent studies of an artistic authority, who has carried desire of accuracy to its utmost limit. I refer to Meissonier.

What studies and sketches, what precious time, what fatigue are necessary for the faithful representation of the living horse. Meissonier laid aside his artistic experience, he became a student once more. His indefatigable palette photographed, so to say, each movement, each period, in order to compose a whole of which the resumé has been the calm gaits of the remarkable picture of 1814. The representation of the horse there is of a merit sufficiently recognised to warrant the recommendation of its study to artists who desire to be rigorously accurate.

Is it an innovation to affirm that Art only embellishes the imitated nature, so far as the artist perfectly possesses in himself all the knowledge which rectifies and renders beautiful in the copy what is defective in the model?

Certainly not; for this was frequently enunciated by artists in the last century. It is true, that from the aspect of the gaits of the horse, this advice has been but little heeded, and that the old masters were very neglectful in this respect. While giving the importance of a task to the animal represented in a picture, they only regarded it as an accessory, to be but slightly studied.

It is certain that, in nature, a horse can exist without uniting all the beauties resultant from the harmony of form. It is for the artist to select that which best responds to the subject which he desires to handle, and is possessed of the qualities necessary to the usage to which he destines his model. We, however, find in former times, the naive representation of gaits as I should desire that they should be to-day reproduced.

Raphael, who it is assuredly inappropriate to cite as a painter of animals, after the specimen which he has bequeathed to us at the Vatican, in his picture of the Creation, has painted in the galleries, a little further on, a Jacob upon an ass, departing with his family for the country of Laban ; the animal upon which the Patriarch rides is at a walk, and its members are fairly accurately posed at the regular *appui*.

Winkelmann said, in speaking of the horse, with reference to art among the Greeks, book IV., chap. iv. : "I will repeat on this occasion the observations which I have elsewhere made, namely, that the ancient artists were no more of accord about the progressive motion of horses, namely, upon the manner of raising and carrying the feet to the fore, than are certain modern authors who have treated this subject. There are some who pretend that horses raise the two legs of each side at the same time ; such is the gait of the four ancient horses of Venice, of the horses of Castor and Pollux in the Capitol, those of Nonius Balbus and his son at Portici. Others are convinced that horses move in a diagonal line, or in the form of a cross ; that after having elevated the right fore foot they lift the left hind foot, which is based upon experience and mechanical laws. It is thus that the horse of Marcus Aurelius, the four horses of his chariot upon the base of the Capitol, as well as those of Titus, upon the arch which bears the name of this Emperor, raise their feet."

I could also cite, in continuation of what Winkelmann wrote, the example of many artistic productions, of which I have ascertained the veracious naivety, in various foreign museums, especially at Florence, Venice, Pisa, Rome, etc.

Winkelmann is as dubious as the others ; he deceives himself in the citation of the horses of Venice, which perfectly indicate the ordinary *appui*, although the elevated foot be a little too much in advance of the one which follows it diagonally.

Whilst compelling myself to describe the horse with the strictest accuracy, in order to place the study at the disposition of conscientious artists, I do not conceal from myself the aridity of this work. Its utility once obtaining

due recognition, I rank myself, in the execution, on the side of those who emit the principle, that in nature nothing is absolute or complete. In fact, as the *absolute* finds its most complete satisfaction in geometry, mathematics and photography, it would be absurd to regard it as the ideal, and equally ridiculous to affirm that a horse differs in nothing from another animal of the same species.

The proof that each man interprets nature according to his temperament is seen in the dissimilarity between the works of several painters endeavouring to reproduce the same subject.

In the observation which I shall submit to the public there is little novel except the persistence with which I have sought to find the appreciation, useful to draughtsmen, which can be drawn from special treatises written within the last century upon the locomotion of the horse : books difficult to comprehend, little read by the learned, and never by artists or amateurs.

The man who should contribute to shed most light upon this difficult question, is assuredly Captain Raabe, for, possessing great experience of the horse and of the exceptional qualities essential for a horse-breaker, he was the first to publicly apply a practical demonstration in a riding-school, after a minute description of the gaits and much examination of the views of his predecessors ; therefore I refer all those, who desire to thoroughly and scientifically examine the subject, to his remarkable work upon the *haute ecole* of equitation. I have derived great instruction from his lessons, and I am happy to be able to record my grateful recognition.

CHAPTER II.

NOMENCLATURE OF THE REGIONS OF THE BODY OF THE HORSE.

Before proceeding further, it may be as well, with the assistance of fig. 1, to afford an explanation of some terms which will be subsequently employed.

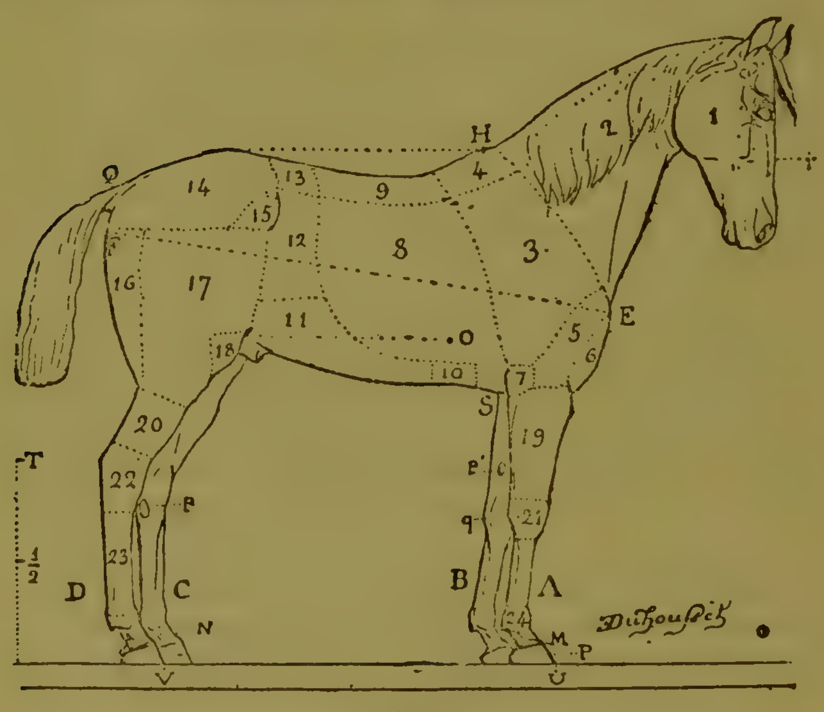


Fig. 1.

1. Head.—2. Neck.—3. Shoulder.—4. Withers.—5. Arm.—6. Chest.—7. Elbow.—8. Ribs.—9. Back.—10. Xiphoid Region.—11. Stomach.—12. Flank.—13. Loins.—14. Croup.—15. Haunch.—16. Buttock.—17. Thigh.—18. Stifle.—19. Fore Arm.—20. Leg.—21. Knee.—22. Hock.—23. Canon.—24. Fetlock.—M. Pastern.—P. Foot —*p.p.* Chestnuts.—*q.* Uniciform.—*s.* Sternum.

A, B. *Anterior Biped.* The fore limbs.—C, D. *Posterior Biped.* The hind limbs.—B, C. *Lateral Biped.* The two limbs on the near side.—A, D.—*Lateral Biped.* The two limbs on the off side.—B, D. *Left Diagonal Biped.* An anterior limb on the left associated with a posterior limb on the right or reciprocally.—A, C. *Right Diagonal Biped.*

The *stature* or *height* of a horse is the distance (H) from the level of the ground to the withers.

The *length* is measured from the point of the arm to the point of the buttocks (FE.)

The limbs considered together are termed *biped.*

The centre of gravity (O), to which it is difficult to assign an exactly defined position, is rather above the xiphoid region in the lower third of the body of the horse when the animal is placed in such a manner of standing as is preparatory to regular gaits.

The *medial plane*, to which frequent reference will be made in the course of this work, should extend from the vertical plane passing by the vertebral column and the sternum, bisecting the body of the horse into symmetrical lateral divisions.

The horse (fig. 1), is comprised in a square, *i.e.*, it is as high as it is long. The head is said to be *lowered*, it approaches the vertical. The animal is placed in the sense that the separation (UV) of the toes of the right side equals three-fourths of its length (FE).

The base of support of the horse is established by causing the limbs of the left side to complete upon the ground the extreme points of a polygon of which UV constitutes the large side.

The left side of a horse is that on which the first stirrup is put on, and for this reason it is called the *near side.*

The beat is a noise perceptible to the ear produced by the contact of the hoof with the ground. The *trail* is the impression left upon the soil; it is discernible to the eye. The *support* is the action of a limb raised to the fore, the rear, or the side. The *appui* is the exertion of the limb on the ground, in every possible manner, the limb moving round the hoof rendered stationary by the pressure.

CHAPTER III.

GAITS.

It will perhaps be useful to commence this study with the inspection of those characteristics which usually constitute force and energy in the horse, the beauty of form affording indication of the capabilities which can be developed, as will also the analysis of the head, trunk, and members. It is preferable primarily to consider the animal in motion; in short, to describe its different modes of locomotion, of which the *minutiæ* of succession and spontaneity constitute the *gaits*. There are three which are termed *natural*—the *walk*, the *trot* and the *gallop*—and it may be said that these are the only ones of which the object is forward progression.

The progression especially takes place upon the appuis which establish the diagonal bases: they are the closest to the centre of gravity.

The position of separation of the lateral bases placing itself in equilibrium outside the line of *appui*, the duration is barely perceptible to the eye, whilst the diagonal base, passing the axis of the centre of gravity, offers solidity and appears to possess a longer duration.

In progression, the rapidity of the play of the members is the greater because of the increased instability of the equilibrium. Therefore the *walk* is the slowest gait, the weight of the body being supported upon two members resting on the ground, either diagonally or laterally.

In the *trot*, the exertion of the diagonal biped drives the body forward and causes it to quit the earth.

Finally, in the *gallop*, the animal, at first sustained by a single foot, is next supported by two and is lastly projected in the air by a final impetus from the foot on which the horse is said to gallop.

The weight of the body of the horse is elevated upon four articulated supports which sustain it and cause its motion : myology teaches that the muscles induce the oscillation and extension for support and *appui*.

I.—THE WALK.

No description will be given of that known as the *initial*, which, corresponding to all the irregularities of the station of the animal, is invariably curtailed.

In the walk, the horse lifts and lowers its feet alternately in the following order : the supposition being that the animal is in motion and that the right anterior member be raised, the left posterior member, diagonally opposite, will follow after a brief interval, the left anterior member next comes and finally the right posterior. There are four times, which cause four audible beats ; the gait is calm and slow.

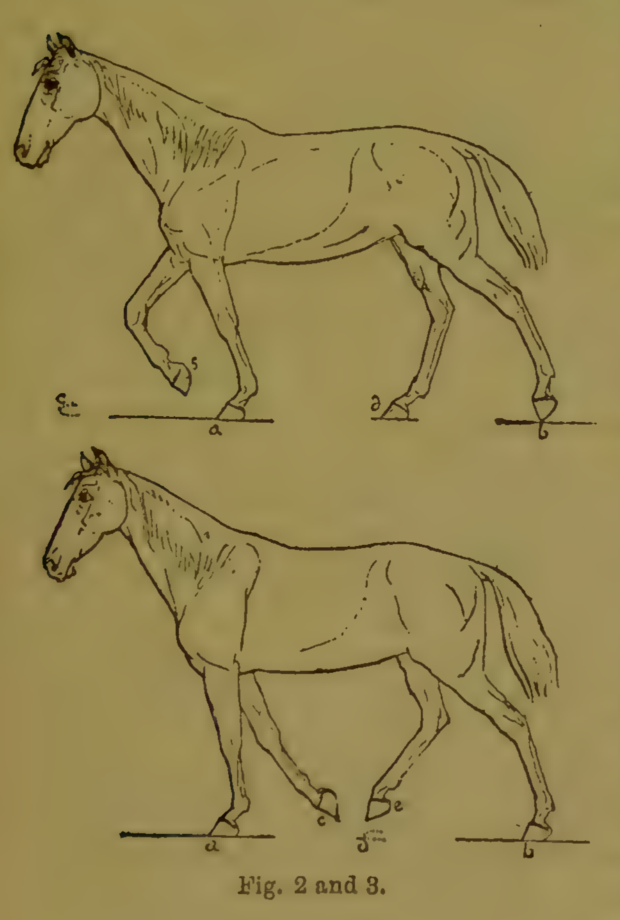


Fig. 2 and 3.

The horse not quitting the ground, the gait is termed *marched* and *diagonal*, in the sense that the diagonal *appuis* are more apprehendable than the lateral (figs. 2 and 3).

The imprint or trail of two feet on the same side, precisely answer to the middle of the space which separates the successive imprints of the other two. ($ab=cd$, fig. 2).

Figure 3 represents the moment of the left lateral base, the complete pace is the separation of the two toes on the left (*ab*). The sketch is at the instant when the right anterior foot (*c*) has left the track (*d*) which will be covered by· that of the posterior (*e*) on the same side. The one (*c*) is the lateral commencement of the support, the other its termination.

The trail will divide in two equal portions (*da*=*db*), the space limited by the lateral feet (*ab*) at the *appui*, of which the distance between the toes often exceeds, by some centimetres, the length of the body of the horse.

The members are successively at the *appui* and the support. A detailed study of the order in which these oppositions operate is the next theme.

The *progression* of a member is divisible into three periods :—

The elevation, support, setting down.

At the elevation (*c*, fig. 3), the anterior foot quits the ground, the limb being posteriorly bent. It thus prepares itself to respond to the impulsion about to be transmitted to it. (Permission must be accorded me to pass from one figure to the other in order to offer adequate explanation of the diverse positions of a foot in progression).

At the *support*, the foot is in the air (*s*, fig. 2), its inferior portion at first maintaining a vertical position, then the toe slightly rises, bending anteriorly, and the foot lowers the heel (*e*, fig. 3), to attain to an oblique flatness for setting down (*d*, fig. 3), as *s* will attain in *c* (fig, 2).

The toe, in the curve it describes, is rarely elevated above the fetlock of the opposite foot resting on the ground. The walk thus effected, the member arrives at the *appui* and follows, by three fresh periods, the progression of which the evolution has just been explained. The poised member is said to beat the commencement, the middle or the conclusion of the *appui*, that is to say, the hoof resting on the ground and the member at first posteriorly inclined, next vertically, and finally anteriorly bent. Such is the evolution which takes place in the *complete step* of the anterior biped.

The posterior biped follows the same periods, and

covers the same space during the same period of time, the hind limbs *theoretically* making their trails upon the tracks of the fore feet.

There are cases where the space between the traces is found to be modified even outside the walk, be it *ordinary*, *precipitated*, or *slow*. Thus, when the animal climbs an ascent, this will be more rapid, and the step smaller, by reason of the rejection of the centre of gravity upon the posterior. The trails will be less far apart and cannot be covered. It is similar when an animal is drawing a too heavy weight, as it then remains supported by three feet so long as is possible.

In the descent, on the contrary, the step of the horse is long, the posterior trail exceeds that left by the anterior member, and the centre of gravity approaches the chest.

The supposition of the animal in motion having just been considered, the motor force ought to be sought, and at the outset let it be emphasized that impulsion comes from the posterior member, the greatest resistance occurring when in the middle of its *appui*. In fact, the member in its restraightment with the hock, puts into opposition muscular forces which have a tendency to farther remove its two extremities, the one, coming into collision with the ground, the rigidity of which serves as a point of *appui*, the body alone offers resistance to the other, which agitates in an upward direction, and anteriorly projects the whole by a direct transmission of the pelvis invariably connected with the vertebral column.

The centre of gravity is immediately displaced ; the body, projected anteriorly and in an upward direction, on its again falling, finds the reaction of this motion attenuated by the elasticity of the attachment of the anterior members, which are perfectly organised as the elastic suspension terminating straight columns.

Having considered the *direction*, which is *diagonal*, it should be said of the duration that, in the walk, three feet rest the very minimum of time upon the earth : this contact with the ground can constitute the points of an isosceles triangle, of which the base is the space between the lateral bipedal ; this is equal in length to the complete

step. The height of this triangle is very small and has a tendency to complete extinction with the acceleration of the gait. The trails contract together until, in the paroxysm of racing, they inscribe themselves on the medial plane.

We have still to consider *the space covered, i.e.*, to fix the absolute length of the *complete step*. I believe it to be very difficult to arrive at an exact estimation. An attempt at so doing has been made by means of a mathematical indication of a connection with the height, from the withers to the ground, a supposition well authorised, more especially when dealing with an oriental horse, inscribed in a square ; but from the artistic point of view, it is permissible to select a long horse, since such exist, because of its additional gracefulness, and because it causes the head to appear lighter.

The result of personal experience makes me prefer drawing a deduction as to the length of the pace from the distance which separates the point of the arm from the point of the buttock, namely, from the length of the animal.

The most practised eye is often deceived in estimation of the two principal measurements—*height and length.*

The height of a horse can preponderate over its length, not only in oriental horses, but even in those the speed of which is shown on the turf. I have proved this fact by measuring a series of photographs of winning racehorses in 1863. At that time a discussion had arisen as to the height of horses in comparison with their length ; the measurements proved the truth of my assertion.

It is rare for the length of a Norman or English horse to exceed $2\frac{3}{4}$ heads.

With Arabs and barbs, in many cases, the length equals the height.

In order to thoroughly impress upon the mind, from the visual point of view, what has just been stated, reference should be made to the termination of the article *Proportions*, where will be found two drawings ; the one is of a horse measuring $2\frac{1}{2}$ heads in both directions ; it is the copy of a photograph representing the proportions of the stature indicated by Bourgelat ; the other is of the

same horse, augmented by a quarter of its head, namely, being 2¾ heads length.

It is highly important to indicate to artists the limit of the separation which can be given to the lateral members. Observations during several consecutive years in Normandy, authorise me to recommend the draughtsman never to allow the complete step to be greater than 2¾ heads, that is to say, only slightly in excess of the length of the animal, or even equivalent to that length.

In addition, with reference to the walk, when the raising of the anterior member is too slow, the shoe is collided by the toe of the posterior foot setting down, and produces an unpleasant noise called *forging*.

A horse can also *hit itself* when the canon, instead of prolonging the radius in a straight line, makes with it an angle which closes inwards and brings the two feet of the animal into greater proximity. When the angle is inversely situated, the feet lose time by describing an outward curve. In this case the animal *strikes twice*.

With short superior rays, a horse makes a small step, but with *high action*. When it suffers in the shoulder, it makes it very low and describes an exterior curve, which is called mowing *(faucher)*. It is said that a limb *razes the ground* when, the superior rays being long, the hoofs rise but slightly above the ground, making an elongated step, and are liable to stumble.

A horse has *speed* when the movement is easy and rapid. *To set well up* is to vigorously lift the extremities. This upward animation is detrimental to speed, and wastes the force in absolute loss to the locomotion. This is the opposite to *razing the ground*, the defect of which, carried to an extreme, is to cause stumbling and falls.

In the *amble*, the body being only laterally supported, necessitates the prompt attainment to the *appui* of the supporting side ; the progress is therefore quick, and the feet very near the ground—in fact razing it.

A horse *rocks* itself when its body inclines laterally at each step during progression in a manner the more apparent because of the width of the breast and croup, and because the tracks are in pairs apart from the medial plane.

In horses of delicate constitution, the rocking is the indication of fatigue of the articulations, and can be caused by weakness and age.

In concluding this chapter, and in reply to the dubitative form expressed by Winkelmann, the learned author previously quoted, it may be said that when the artist represents two feet of the same lateral face in the air (*c*, *e*, *fig.* 4 A), he will place them very close to one another, for this can only be seen when the posterior foot, about to place itself upon the trail of the anterior of the same side, is on the point of attaining its aim by placing itself in the trace of the first. This is the excessively brief instant, during which all the weight of the horse reposes upon the lateral biped (*a*, *b*), opposite that which is in the air (*c*, *e*).

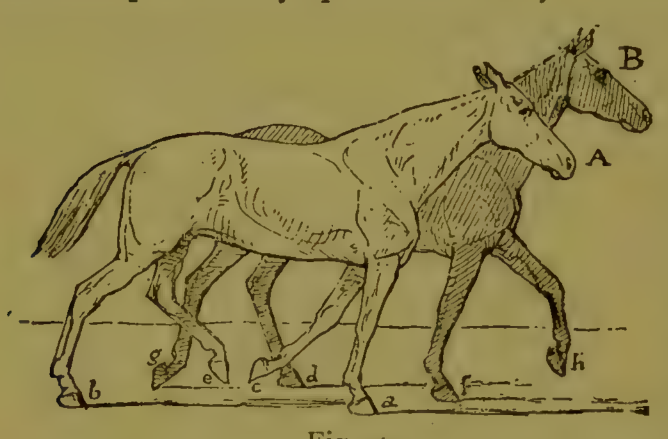


Fig. 4.

The *appui* upon the lateral base, which, as has been before observed, is formed by the two feet on the earth on the same side (*a*, *b*), has just been treated ; every time these two feet are drawn at the *appui*, it is essential that their elongation, one from the other, be that of a complete step.

Passing on to the diagonal base, the two feet which constituted it, by their *appui*, are brought nearer to the half-length of the step (*d*, F, *fig*. 4, B), whilst the feet in the air are at a greater distance from each other, *i.e.*, at the support (H) on the cessation of the *appui* (G).

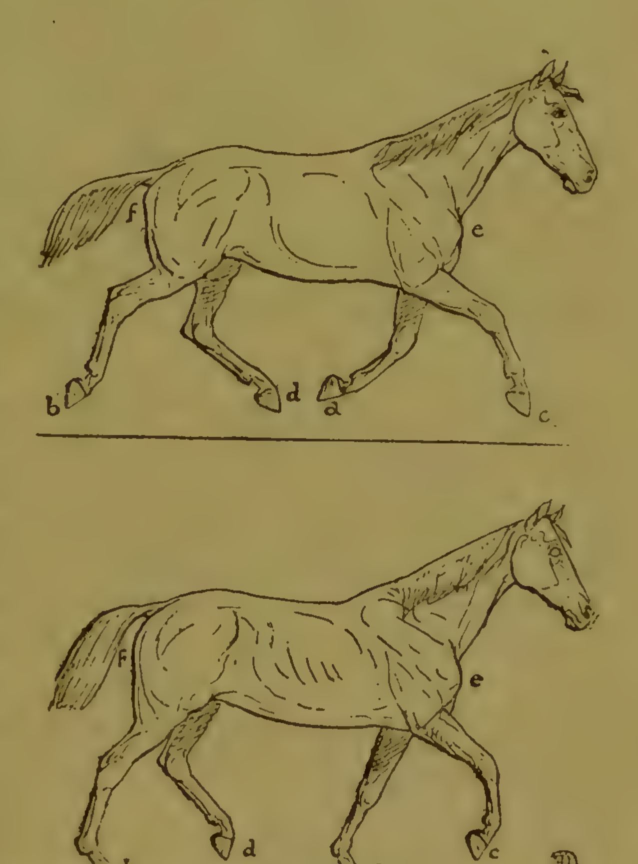
These resources are considerably less for the sculptor than for the draughtsman and artist ; having neither ground nor sky at his disposal, he must apply himself the more assiduously to the reproduction of a movement which can be regarded without fatigue, whilst at the same time it is frankly a reproduction and limited.

To stereotype a violent motion in the middle of its movement is to convert it to immobility ; the artist

avoids this difficulty by means of accessories so disposed as not to be detrimental to the conception of the action which should be felt by the spectator—the aim of the object represented. Ability is shown in finding and not unduly emphasizing the line which claims attention and fixes in the air the action about to be accomplished, while at the same time it yet leaves something to the imagination.

2.—THE TROT.

The *trot* (figs. 5 and 6) is composed of two periods—the *appui* (fig. 6) and *the projection* (fig. 5). The horse commences this gait with a diagonal biped; the feet, diagonally opposed, rise at the same time, support themselves and together come to the *appui* to resist and anteriorly project this biped, whilst the other limbs having gained space in the direction, in their turn attain the ground, in order to support the body and to impart a fresh motion to it.



Figs. 5 and 6.

It is this period of projection (fig. 5) during which the four feet have quitted the ground, which is usually selected by draughtsmen when representing the horse at a *trot*, for the raising of each biped does not wait for the setting down of the other. In this instance it is permissible, without fear of error, to separate the members a little from the ground and to extend them

whilst precipitating the gait, since, on augmentation of speed, experience has proved that the *projection* is of longer duration than the *appui.*

In the *ordinary trot*, the space between the diagonally opposite feet in the air, is the same as that of those which attain the earth in order to rebound.

At the ordinary gait, the distance between these two toes does not exceed three fourths of the length of the animal, $ab=cd$: $ab=\frac{3}{4}$ of ef (figs. 5 and 6).

In the *trot*, the beats are at regular intervals, the four feet only acknowledging two; each diagonal biped, arriving in unison, constitutes but one beat with its two trails.

The *trot* is the best gait for covering ground, and for the endurance of a prolonged journey.

The equilibrium obtaining sufficient stability on the successive diagonal bases, the motion is less fatiguing to the horse and is wholly favourable to its progression.

In the rapid trot, the neck and head elongate and the tail becomes detached from the croup.

A horse, of good conformation, on horizontal ground, should, when trotting, place the posterior foot on the trail of the anterior. Numerous experiments convince me that the practice of this gait, although sufficiently lively, generally brings a trail of the posterior member indicated in the rear of the anterior member. It is more or less the difference in this respect which constitutes the *small trot*, always caused by a too heavy weight, ascending ground or excessive fatigue.



Fig. 7.

In the *rapid trot*, the trails of the posterior members precede those of the fore-limbs. A speed equal to that

of the gallop may thus be obtained, and a very great distance can be covered. The English call that gait the *flying trot*, in which the trails are unequal and the trot becomes broken up (fig. 7).

An error frequently committed is in the representation of the period of *appui* in a short trot, when desirous of showing a horse at a walk. The statue of Henry IV. on the Pont Neuf affords an example.

I will indicate a very simple experiment for ascertaining the positions of feet in calm gaits. Fig. 8 represents a horse, A, *trotting*, at the *appui* and B, another walking on the diagonal *appui*.

The horse, upon the *appui* of the trot, (*d*,*f*, fig. 8, A), shows, to an observer stationed behind him, feet diagonally opposed on the right, (*a*,*b*), lifting themselves at the same time and having, at the support, similar movements, which betray themselves to the eye by the parallelism of the two hoofs, which are seen to be vertically together. Whilst, at the *walk* (B, fig. 8), the diagonally opposed hind-foot being always one period late, when the vertical hoof of the fore foot is seen at the

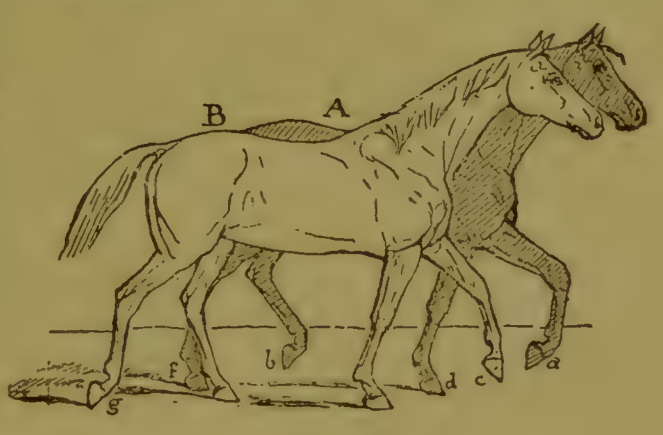


Fig. 8.

support, that of the hind-foot still at the elevation, makes, with the toe of the former, half a right angle, and when this latter hoof becomes vertical (*g*), the forefoot (*c*), lowers the heel in order to reach the ground obliquely. As seen in fig. 8, the hoof (*c*) of the white horse at a walk is oblique, whilst that of its neighbour (*a*) is vertical.

Although the verification of the displacement of the members of a horse at a walk are difficult to state with precision at the first glance, I believe the attainment of this aim may be reached by the means about to be explained.

The spectator, who watches the march of a horse, perceives the moment of elevation far better than that of setting down. If the same spectator mounts the horse, he will feel, even without being very impressionable, *the setting down of the fore feet.*

By combining these two observations, the horseman will be perfectly capable of fully comprehending the play of the members, if he will march the horse, at a walk and in the sun, either on a road or near a wall, and select a suitable hour when the silhouette of the animal projects a shadow equal to its height. This will perfectly translate to the eye the evolution of the posterior members and will positively prove the lateness of this foot opposed to the anterior, of which the rider perceives the beat.

The phrase of the *setting down of the fore feet* was purposely italicised, when its perceptibility was stated; thence it must not be concluded that that of the hind feet is also capable of apprehension. The explanation of this is found in the dictum of Baucher, who was never wearied of refuting, as erroneous, the opinion of those who pretended to feel the movement of the posterior extremities at a walking gait and who, according to themselves, could profit thereby so as to cause the horse to start, at will, either on the right or left foot.

The difficulties of equitation are already sufficiently numerous, even with the exact knowledge of the most natural means, without their augmentation by impracticable notions.

3.—THE GALLOP.

I have often heard the objection advanced that every lively and raised gait escapes analysis because too difficult for absolute proof. But I believe the explanation is to be found in the facility for the unchecked reproduction of a defective attitude, long admitted by convention. At all events, an endeavour may always be made to take it into account.

No gait offers so much liberty to the artist as the gallop; therefore allusion will only be made to what is necessary for some slight regulation of this vagrancy, and for putting a certain limitation to this disorder.

There are three sorts of gallop :

I. The natural gallop.
II. The slow gallop.
III. The full racing gallop.

In the *natural gallop*, with three times, the horse lifts itself from its anterior members and projects itself forward by the detention of the withers ; the posterior members being involved beneath the body.

The horse is said *to gallop to the right*, when the right fore member leaves the prints of its trail in advance of the left member of the same bipedal, and when the right hind-leg marks its trail in advance of the left. If the contrary takes place, the animal is said *to gallop to the left.*

In the gallop with three times and to the right, the horse straightens the neck and head to lighten the anterior, which it raises, commencing by lifting the left member. This remains slightly bent, whilst the right extends in order to encroach upon the space in front with the foot which decides the gait.

The body is put into motion by the posterior members involved under the centre of gravity. In the

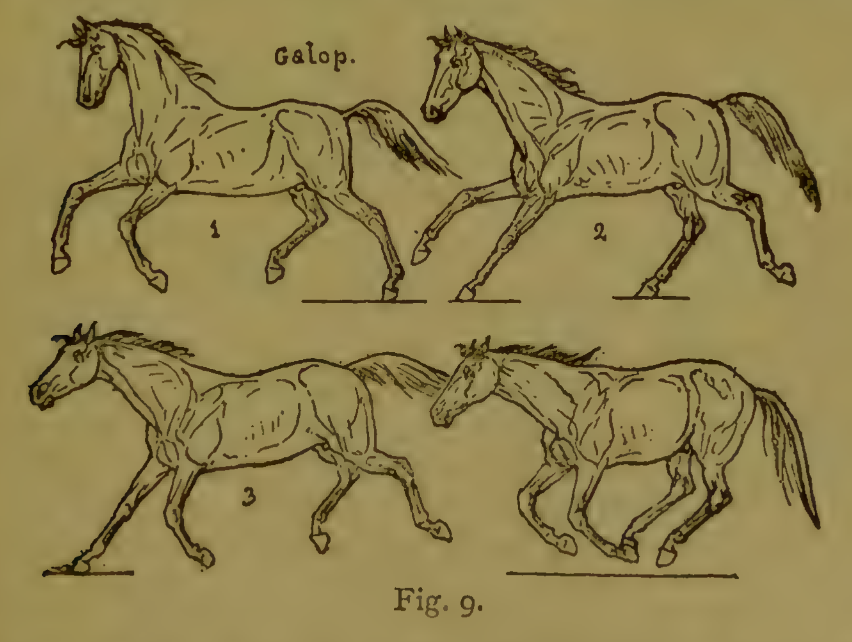


Fig. 9.

gallop to the right, it is the left hind leg which first reaches the ground and causes the extension of the first battue (1, fig. 9). The second is struck by the

foot in opposition and the left fore-foot (2) which strike at about the same moment (left diagonal base). Finally, the third battue is produced by the right fore-foot, upon which the horse gallops (3). This causes elasticity, and the body, thus propelled to the front, becomes suspended in order to recommence three fresh trails.

The first battue of the succeeding foot is struck by the left posterior member.

The trail, in the rapid gallop, shows itself well in advance of the last trace of the right anterior foot, the effort of which has determined the suspension of the four members. The less violent this effort, so much the more are the trails near one another.

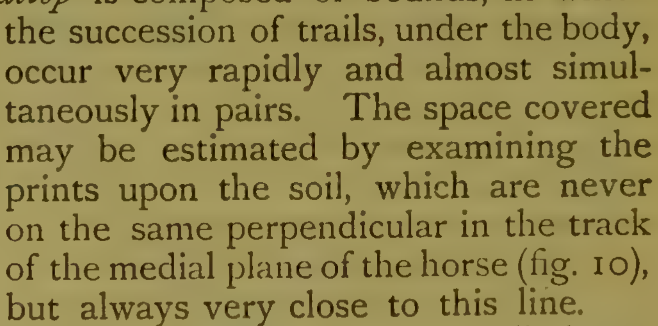
In the *canter*, the hind foot gains very little ground, and attains to a position in the rear of its opposite diagonal, which has determined the side of the gait. Certain bas-reliefs in the Parthenon provide examples.

In the gallop *with four times*, the horse, having an exaggerated *rassembler* (members under the body), throwing its weight forward to the detriment of the hind quarters, has a more elevated effort; the members cause four beats to be audible and cover little ground. The gait is shortened, the result of training.



Fig. 10.

The *racing gallop* is composed of bounds, in which the succession of trails, under the body, occur very rapidly and almost simultaneously in pairs. The space covered may be estimated by examining the prints upon the soil, which are never on the same perpendicular in the track of the medial plane of the horse (fig. 10), but always very close to this line.



I have said that the feet fall almost at the same time in pairs, but each precedes the foot opposite to the side on which the gait indicates itself. The members only marking two battues, a little dragged, appear to rebound upon their trails and the body becomes suspended. To the eye of the spectator, the extremities appear to rise at the same time and to fall likewise. It is in this that the full gallop approaches the leap.

The more vigorous the previous detention, so much more does the length of the time of oscillation in the air extend, especially if the body has been horizontally projected. The *appui* undergoes reduction in proportion to the acceleration of the speed of the gait.

This suspension causes the imminence of a downfall, and compels a rapid displacement of the members in order to attain to a support of the body, which has a tendency to fall, and which does actually fall on each foot in succession, at the moment when its impulsion, without any cessation of production, becomes insufficient to support it at a certain altitude from the ground.

The old term, *ventre-à-terre*, used for the purpose of representing the paroxysm of development in this gait, expresses, in a very accurate manner, the act of detention, when the members are extended in a contrary direction; for, in this position, the horse is nearest to the ground. It is, therefore, a mistake, when thus representing it, to isolate it too much from the soil, which removes it from the point of resistance, towards which it has a tendency to rebound.

For the purpose of personal conviction, I advise the verification which can be made by two riders with horses of the same height. If the one remains motionless whilst the other passes him at a trot, this latter will appear sensibly smaller, that is to say, more adjacent to the ground, and if the experiment be repeated at a gallop, the more accelerated the gait, the greater the diminution of height of both horseman and horse with reference to the stationary observer.

This verification, which has been held in little value, has none the less been long known, for in Leonardo de Vinci (ch. cclxviii., on four-footed animals and how they walk), may be read :—" Those four-footed animals which are highest in body, receive more variation when in motion than when they remain stationary, and this in varying degree according to the greater or lesser size of the animals. This proceeds from the obliquity of the legs which touch the ground, for they lift the form of the animal when leaving their obliquity and pose it perpendicularly upon the ground."

Although not demanding the representation of all the

successive periods of very rapid gaits, none the less it is expedient to explain the period preceding that when the body of the horse is at the utmost extension.

Of the two periods of the racing gallop, that of the preparation for the detention is thus effected : the anterior members have just quitted the ground and are both bent



Fig. 11.

to the rear, whilst the posterior stretch out to replace them, and even mark their trails much in advance of those left by the first (fig. 11).

The croup is strongly engaged beneath the animal, the neck is extended to the fore and the tail is detached ; my advice is to avoid the reproduction of this ungraceful posture, which appears forced and yet is accurate.

Latterly, from America, have come instantaneous photographs taken by Mr. Muybridge, which present the series of the different positions of the precipitated gallop.

On the appearance of these silhouettes, which at a first glance must be confessed surprising, horse lovers, and especially artists, vehemently protested, because in them they found no correspondence with what, until then, draughtsmen had offered as representing the gait of the gallop.

I suitably spaced these photographs and submitted them to the test of the zootrope : the experiment was conclusive and the movement was produced, *recomposed*, *complete*, and *successive*, with all its periods. Here I present to the reader the complete set of silhouettes in the order in which this optical illusion was shown in the animating mechanism to which reference has just



Fig. 12.

been made. The zootrope of the gaits of the horse can be obtained at the office of *L'Illustration*, 13, Rue Saint Georges, Paris.

In the natural gallop, that with three times, or hunting gallop, a mitigated pace in open country, the traces of the two opposite members are never parallel in pairs, as formerly represented ; therefore, the *anterior members* should not be drawn at the same flexion, with a very open angle having its apex in the chest and terminated by feet which diverge at unequal height from the ground, (A, fig. 13), for, if examination be made of the traces which these leave upon sand or slightly damp soil, it will be perceived that these feet really converge, since the quicker the gait, the more the trails have a tendency to come nearer each other in their succession (B), in the intersection of the medial plane of the animal with the ground.

When the head and neck of the animal are carried to the fore, in order that the nostrils, the larynx and

the lungs be in a straight line for the facilitation of the introduction and emission of the air in the lungs, it is the paroxysm of the racing gallop, in which, however great the detention of the members, the extremities of the hoofs never exceed the end of the lips when the neck has attained its full development.

An English author, quoted by Gayot, excellently specifies the gallop with two times, by saying that the horse lifts its legs from the ground just high enough to avoid obstacles ; it bends the back and loins, then extends them, shoots forward the members like darts,

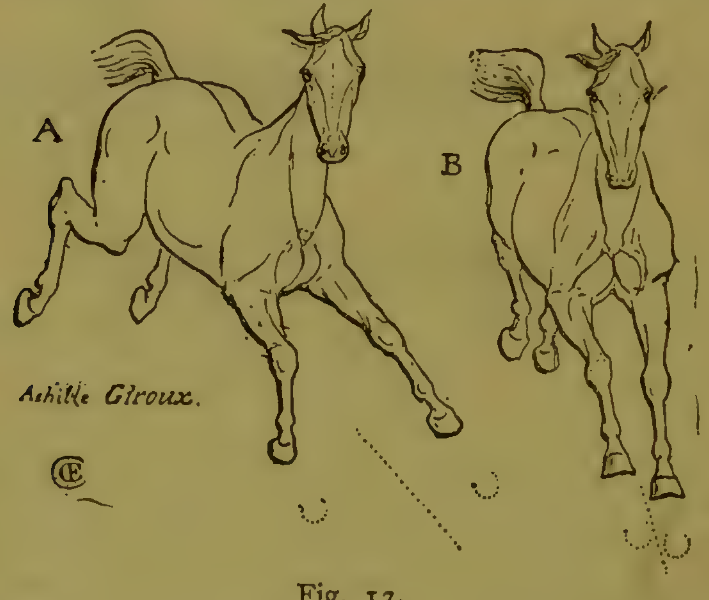


Fig. 13.

and achieves its progression by a series of springs, which only a well-bred horse can execute. "This rapidity is the consequence of the length of its body, neck, back and loins, of its shoulder, fore-arm, thighs and pasterns. Only a horse thus shaped will exhibit prowess on the race-course." From what has just been read, it is clear that this would be a perfect horse.

In the last century, and even in our own time, many military scenes and hunting pictures only represent the gallop with parallel tracks, and the posterior bipedal pressing with an equal effort on both toes for the start of the gallop (fig. 14). It is thus that Carl Vernet represents his horsemen in battles, races and hunting scenes, imitating all his predecessors who were painters of horses.

This has just been demonstrated to be a false interpretation of the animal in motion.

The more an error be propagated, the more must its rectification be sought by means of convincing arguments: the experimental method is, in this case, the most conclusive.

It has been seen, by what has been already said, that the racing gallop has, for more than a century, been interpreted by an inclination of the neck of the horse in a state of tension approaching the horizontal, the fore limbs apparently swimming parallel with the ground, thus exaggerating their length even to the representation in profile of the feet of the animal in *advance of its nostrils*, which, however, form the most advanced point of the whole body in the *ventre-a-terre* gallop.



Fig. 14.

Protestation has often been made against such an error of drawing, reproduced with deplorable persistency in the Salon, when portraying upon canvas a horse moving with the most exaggerated speed.

When studying nature, I have had many proofs of the great departure from veracity. I shall describe my last experiment: it was made upon a well-bred mare, the members of which were long in relation to the stature, as will be seen by the statistics appended later. I had just previously made its articulations flexible by walking exercise of several hours duration.

I had, for assistant, a retired cavalry farrier, accustomed to manipulate the limbs of the animals, and an adept at maintaining them in a desired direction. This permitted me to have an anterior limb drawn and held in extreme extension, whilst I sketched the horizontal attitude: I next measured from the neck to the base of

the radius (40 centimeters), and from the very visible tuberosity of the knee to the end of the foot (48 centimeters), that is to say the small bones, the canon and the pastern, as well as the superior portion of the hoof as far as the toe, the continuation being made in a straight line (see fig. 15).

After which, causing the extension of the neck and head, I measured from the insertion of the first in the chest as far as the jaw (58 centimeters), from this to the end of the nose (45 centimeters), adding for the neck and head 56 c + 45 c = 101.

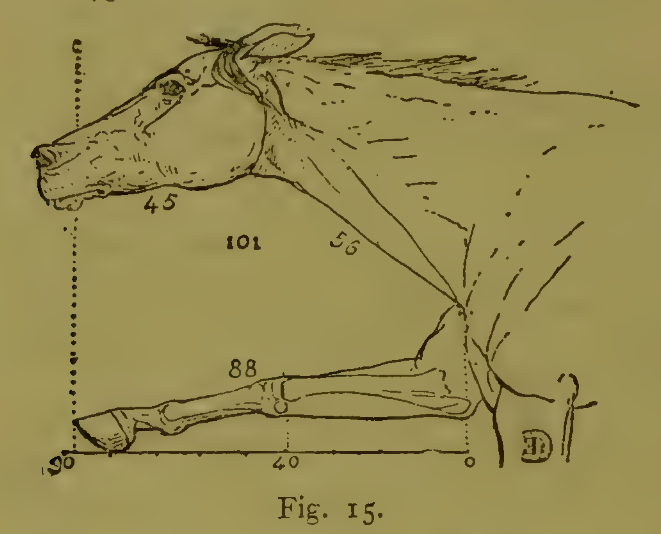


Fig. 15.

Elsewhere, for the anterior member, 40 + 48 = 88: the end of the nose therefore exceeded by 13 centimeters the end of the foot, the point of the elbow, drawn to the fore, being found to be upon the vertical of the anterior extremity of the sternum (o).

The stature of the animal, its height	1 m. 53 cent.
Its length	1 m. 56 „
Length of head..........................	60 „
Length of anterior member from the elbow to the ground	90 „
Length from the ground to the sternum	83 „

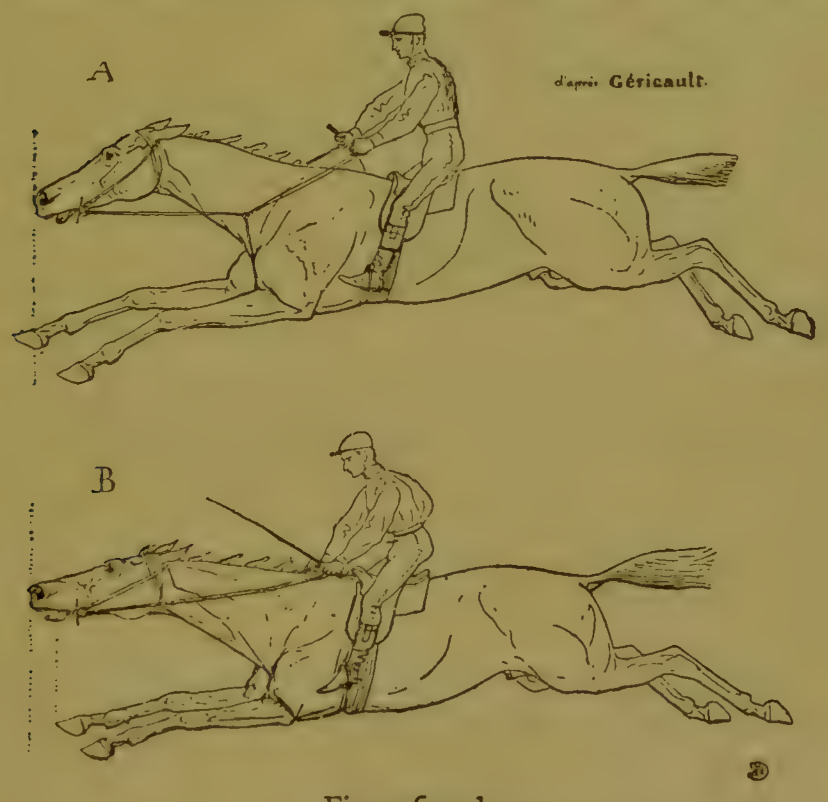
I would remind the reader that the mare was fully developed and had been often leaped and hunted.

It is unnecessary to remark that the end of the nose is a very important detail in a race, because of the advantage offered by this valuable index for the decision of

arrival at the winning post: trainers, with this object, take the greatest pains to select a horse with a long neck and to develop this portion so far as may be.

It is in the violent *ecart* which is produced in the scapulo-humeral articulation, to which I have just given its greatest development both as to flexion and extension, that full justice can be rendered to the play of the large rounded head of the humerus under the superficial and little extended glenoid cavity of the scapulum.

The figures I have just given, were taken upon the left fore-limb; having recommenced, eight days later, on the anterior off-side member, the fresh observations confirmed the results of the experiment I have just described. Although very easy to make, I must none the less warn the reader that certain preliminary precautions are neces-



Figs. 16 and 17.

sary. Preference in the selection of an assistant should be given to a powerful man.

It is very easy to find an immediate application of the knowledge acquired by the experiment described above. The beautiful canvas of Gericault, exhibited in the

Louvre, affords a subject, in his *race horses*, going at the utmost speed and having the appearance of flight.

The artist is a great amateur of horses and one well-acquainted with their exterior. But on a comparison with painters of the same subjects, both predecessors and contemporaries, he will be found to have committed the error of unduly extending the anterior members of his racers; the foot goes beyond the nostrils (A, fig. 16). On the previous page I have re-sketched (B, fig. 17) Gericault's horse, making the small corrections demanded by nature, so that the extension of the members be in conditions more conformable with the truth.

4.—AIRS DE MANÈGE—MODIFICATION OF GAITS.

We have dealt with what propels the animal to the fore, in a desired direction, without any exclusion of the possibility of animating it, of imparting grace to it, or of collecting it by balancing the gait and throwing the centre of gravity to the rear.

In this last case, the impulsion of the withers lifts the body up instead of pushing it, this being obtained by the exaggerated flexion of the neck and by the head coming to a vertical position, the chin almost joining the chest. The piaffer (pawing) and the gallopade afford proofs of this and so far, may be said, up to the present time to furnish the sole positions of equestrian statues, besides the *stationary attitude*.

These modifications of natural gaits are generally exact, and selected because they impart more animation to the subject.

In the *airs bas* of the domain of the *high school* are all those figures which a horse can be made to execute upon two tracks at a *step*, *passage*, *piaffer* or *gallop*.

The *artificial motions* are the *leaps* in which the horse raises its anterior or posterior members or even the four together. They are designated under the names of *pesade*, *curvet*, *croupade*, *ballottade* and *cabriole*.

A little space must be devoted to these airs of manege, both because these attitudes are frequently found in the pictures of the old masters and also because modern

artists, especially sculptors, do not, in equestrian subjects, quit the poses found in the *airs bas.*

The *piaffer* has the appuis of the trot, with the fore-arms and the feet at a greater distance from the ground ; it is made a stationary position.

The *passage* is an audible and elevated walk bordering on the trot ; the members remain longer in the air than at the piaffer. For the proper execution of the passage, a perfectly collected animal is essential, one who will advance but very slightly each time.

In the *pesade*, the horse lifts its anterior very high, as in the prance, and prepares for the *curvet*, or succession of bounds in which the members quit the ground in pairs and return to it together.

The *gallopade* is a very restrained gallop with four times, the execution of which is attained with very slight perceptible gain of ground ; it is more elevated in front than the ordinary gallop.

In consequence of these airs, it is necessary to draw the superior rays very short ; for if the fore-arm be long, the knee being therefore nearer to the ground, everything contributes to favour the progression. In this case, this member, which has a disposition to skim the ground, gains considerably in advance ; such is the race-horse.

The contrary disposition occurs, in what we are now considering, and especially pertains to the parade and manège : if, with a short fore-arm, the hocks are bent and the pasterns long-jointed, all the desired brilliance can be obtained, the entire development of muscular force expending itself in an upward direction,

Finally, let it be said that the *croupade* is a more elevated leap than the curvet ; one in which the horse tucks the hind-legs under its stomach and bends the hocks as much as the knees, and at the same height.

The *ballottade* is a leap like the croupade, but the animal, in place of bending the hocks under the belly, presents its hind-hoofs as though about to kick without giving the kick, as in the *cabriole*, which latter only differs from the croupade and ballottade in this particular. Formerly this elevated air was regarded as the most perfect of all leaps.

Here shall be pointed out the error of a great number

of artists, who never portray the leap of a horse over an obstacle without its giving a kick, which is in reality, an exceptional occurrence.

The *defective gaits* are the *amble* and its derivatives, *the high walk*, *ambling* or *rocking pace*, *the aubin*, or broken amble, in which the horse, usually ruined, gallops with his fore and trots with his hind members. Here I will only speak of the first.

In the *amble*, the centre of gravity is not upon the line which unites the two extremities of the lateral *appui*, which tends to cause the fall of the body on the side of the raised members. For this reason, these last are never far from the ground, in order that they may revert the more rapidly to the *appui*, their duty being to foresee and support this fall.

Certain American trotters, after a special training, thus afford a trot of immense speed with lateral appuis.

I have often heard the *amble* confounded with the phase of the diagonal *appui* of the *walk*, which we give (see fig. 2). This error arises from the slight parallelism which affects the lateral members *a* and *b*.

In the amble, not only is there the parallelism during the two complete periods of the walk, but, as a consequence, the bipedals lift themselves together and together arrive at the *appui*, after equal oscillations.



Fig. 18.

Backing is effected diagonally (fig. 18). In the ordinary retrogression, the horse has at first a single foot at the *support* and three for the *appui*. When the animal accelerates this movement, the diagonally opposed feet lift themselves together and the recoil takes place with two times, but rarely in a straight line. Great strength is necessitated in the loins and hocks for due satisfaction of the reiterated efforts of the horse in the curvature of the back and the assumption of the point of *appui* on

the croup in order to accomplish an act which causes an inversion of the habitual play of the members. Many horses, weak in the loins and hocks, or saddle-backed, refuse, defending themselves or escaping by forcible self-projection in a lateral direction.

The trails of backing are less separate than in the walk and never cover each other, even when the retrograde movement is very quick.

A horse rears for the purpose of attack or defence : it is an action in position, an unnatural posture which becomes dangerous, more especially if the animal uses it to throw its rider. In this case, it often happens that it has not sufficiently calculated its spring and so it throws itself backwards or falls on its side.



Fig. 19.

In rearing (fig. 19), the horse has a tendency to throw the centre of gravity on the posterior. With this aim, it rapidly throws back both head and neck at the same time as it firmly brings its inferior members under the body.

The anterior members raising the anterior for the energetic execution of the ascensional motion aided by the muscles of the hind-quarters, have a tendency to impart horizontality to the femur between the coxal and the tibia which become almost perpendicular to it.

Long animals, and those heavy in front, rear with more difficulty than those which obey with facility the effort produced by the muscles of the abdominary members to bring the anterior portion in equilibrium upon them by the straightening of the vertebral column.

Arab horses and hunters are generally vigorous and often rear. They also lift themselves easily for leaping.

The kick (fig. 20) is, like the rear, a defence for the horse. The preparation for it is instinctive and subordinated to its nature ; it is a rapid projection of the posterior

members. The first effort raises the croup, the second seeks an *appui* upon the resistance it desires to fight against.

This violent, and necessarily very brief, displacement needs assistance from the fore-part of the animal in relieving the hind-quarters, which is accomplished by the forward transportation of the centre of gravity. The horse brings its neck near the chest by elongating and lowering the head. It thus burdens the anterior and the whole body is supported by the anterior members, firmly fixed upon the ground and even camped, whilst the back and loins in their elevation, facilitate the projection of the hind legs which give the kick. The two feet come near to one another, in order to attack the object aimed at with more force.



Fig. 20.

I have, likewise, ascertained the proximity of the tracks of the two hoofs upon the portion struck; the kick is one of the artifices a steed employs to get rid of its rider.

A horse is impeded from kicking by holding its head up and by overweighting the hind quarters.

The *leap* can be made from the set feet, but is generally executed during a gallop. The horse encounters an obstacle of a certain altitude, and without perceptible abatement of the gait, clears it vigorously and pursues its way. What has occurred?

A little before arriving at it, the horse has appreciated the act demanded of him—we are here speaking of an energetic animal—its eyes and ears have given as clear indications as could be imparted by verbal utterance; as has been said when considering the rear, it prepares itself by acting upon the hocks in proportion to the spring required to project its mass both forward and upward over the obstacle.

If it be a question of a little ditch or of a stream with clear-cut banks, the displacement will be accomplished by an almost horizontal leap, with the head low and the detention close to the ground.

In the case of horses which bravely encounter the obstacle, the rider, giving the horse as much liberty as possible, firmly seated, the legs pressing close and progressively closed, need only possess flexibility and should give free permission to the horse to take its own course.

Should the animal put too much animation into its gallop, its energy must be checked, for its exaggerated use will cause a fall; the rider will come to the assistance of such a horse by sticking his spurs in behind the girths to prepare and support them, so as to cause them to rise with sufficient promptitude and into an attitude elevated enough for success.

The see-saw motion can then work freely, the anterior members being the first to attain the ground, almost simultaneously and very near to one another. These, by a violent effort, instantly set off again, leaving space for the hind-legs which undergo extension in order to touch the ground: the two trails are very close to one another and their impression is even in front of those left by the anterior members.

During the displacement of the leap and from the time of the detention of the posterior, the animal has maintained its anterior members close to the breast and to the medial plane; the posterior members bend in closing the angle of the hocks, the hoofs being almost joined. The error is usually made of separating them by posing them parallel to one another as if they were kicking, and the fore members are made to diverge at the moment of their extension in order to fall, so that the animal has the appearance of swimming over the obstacle. Examination of the trails left on the ground will assuredly convince any one of the impossibility of the direction, tending to separate the feet from one another, which it is customary to give to the members, since the trails are very close to the medial line.

I support these observations with the wood-cuts,

which represent what has just been explained and give the leaping attitude in its successive aspects.

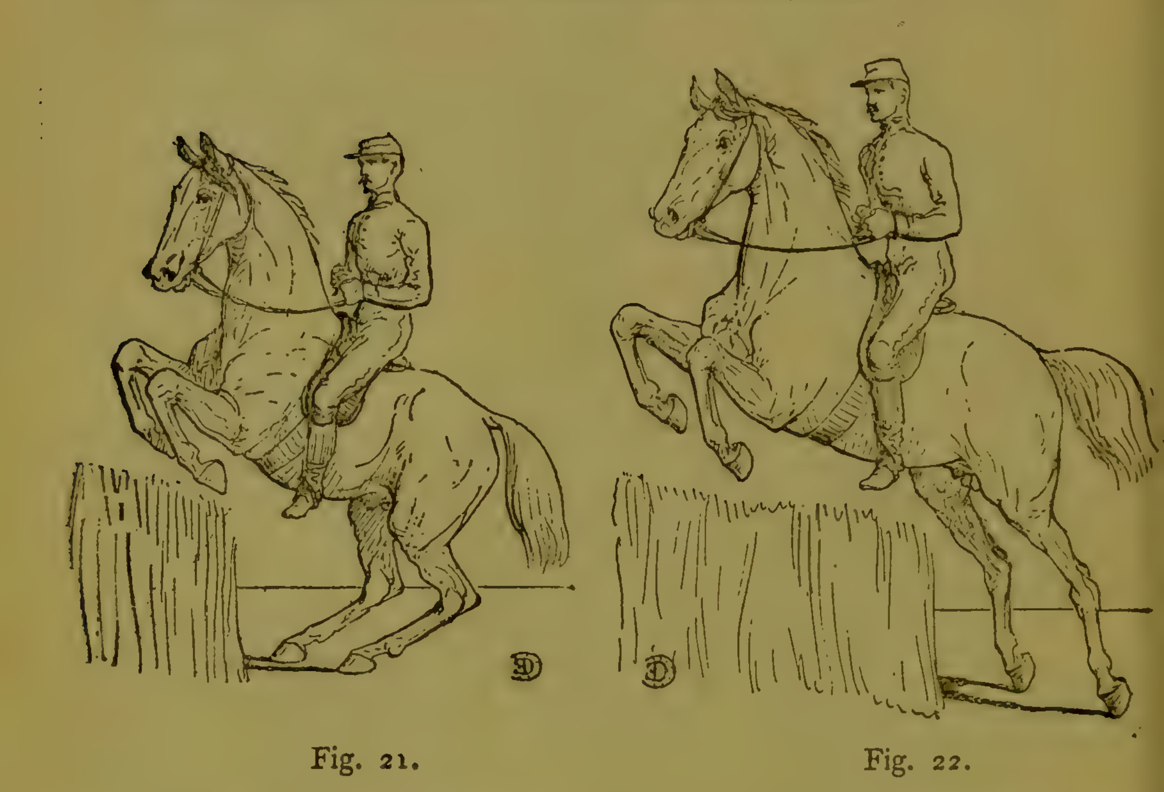


Fig. 21. Fig. 22.

Fig. 21. Preparation, as in the rear.—Fig. 22. The horse lifting itself, at the instant of the detention and abrupt extension of the hind-legs.—Fig. 23. The anterior members are about to extend themselves, the body bends and the anterior clears the obstacle.—Fig. 24. The hind legs in their turn, clear it and recover themselves; still situated under the body, they have a tendency to rejoin the anterior members (fig. 25), the tracks of which they will pass and mark their own trails very close together, whilst the horse see-saws in its recovery under the action of the anterior bipedal, which has just flown back as in the time of the gallop (see fig. 2).

Draught Horse. In speaking of gaits, I have so far confined my observations to the saddle horse. Now I wish to say a few words about the horse in harness, commencing with the most rural, which often figures in landscapes and pictures of farm-labour.

When representing a team, it is necessary that the animal make the best use of the strength demanded of it.

The horse which draws, exerts itself not only by its muscular force, but also by its weight. The expression

giving in the collar exactly renders the action of making use of all possible effort to propel or drag the collar.



Fig. 23.

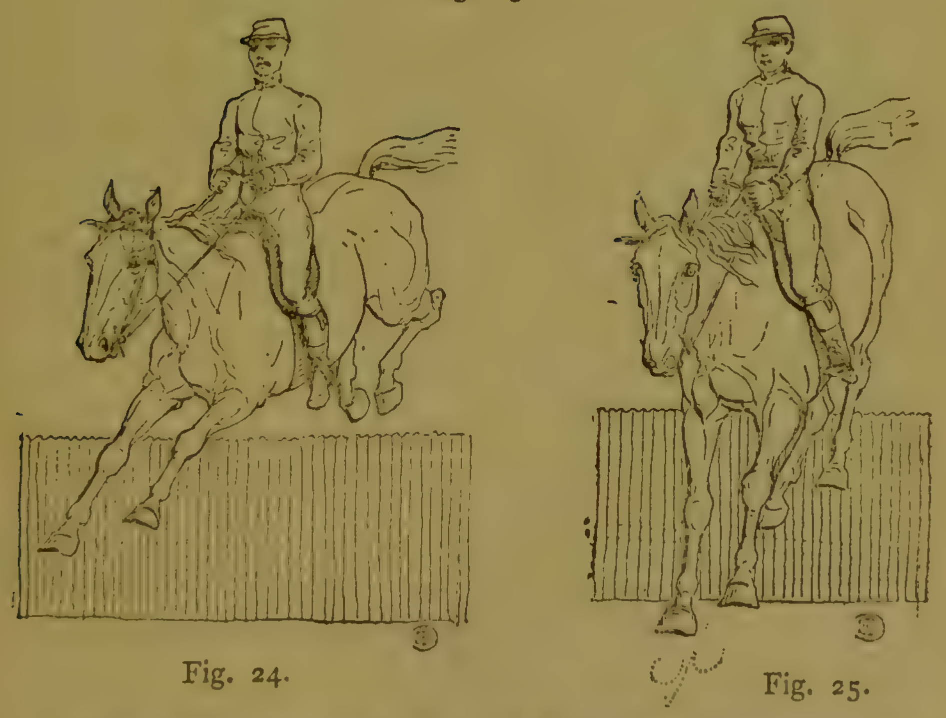


Fig. 24. Fig. 25.

The draught horse or *towing horse* should have a capacious breast, capable of easily containing the

respiratory organs, well protected by firmly rounded sides, the angle formed by the direction of the omoplates well open, enlarging the chest, separating the anterior members from one another and thus constituting the solid base of a vigorous *appui*.

The power of contraction is incited, it is true, by the less lengthy muscles, because the withers and the breast are lower (the sides shorter) ; but the thickness of the muscular layers gains both in force and in resistance what is lost in speed, and as it concerns a dray, that is to say, sustained efforts supported for the conquest of a resistance, it is almost exclusively in a calm gait that these great horses, usually agricultural, are found portrayed. They should be given visible muscles, a robust neck on which is grafted a strong head, a hairy forehead, the jaws apart, the nostrils open, with a large throat, cylindrical chest, short loins, round and muscular buttocks, solid members, low, large and hairy.

I have alluded to the *towing horse ;* a particular species of traction occurs in its case. The boat being upon an uniform surface which always offers the same resistance, once the first impulsion be given, the subsequent efforts are all similar. It is in this instance that the gait should be the most calm and regular possible, for it is broken only by the obstacles that the rope may encounter on the steep banks, and usually the towing path is only useful when it is as flat as possible.

The model of *the light draught horse is the breed* from the French province Perche ; it can trot whilst drawing a laden carriage and is serviceable for artillery manœuvres. The heavy draught horse is the Boulonnais.

From the draught horse, we have especially demanded the use of all its strength, without exacting a gait other than one usually slow. The *coach horse* or *carriage-horse* is a link of union between the foregoing and the saddle horse, which it often replaces, although slightly higher : its traction is alleviated by the ably-combined weight of the vehicle, travelling upon smooth and well-kept roads.

More speed and greater lightness is required from the gait of the carriage-horse. It should nevertheless be robust and big, with a well-developed neck. The

shoulder need have but slight inclination. Vivacity and docility are also demanded.

In France, there are some fine Norman carriage horses, these are the peer of the English breeds, which are however much in request for magnificent equipages.

The *hunter* and the *charger* are those most frequently required for pictorial representation.

The *charger* has its type in the barbs and Arab horses. Everyone is acquainted with the vigorous, but well-connected form, its adaptability and docility.

The *hunter* is often an English horse, said to be a cross-breed. It is the product of a well-blooded brood mare. Large, with solid members, having pure blood which gives foundation and vigour to the product, which is robust, through its mother, it has rounded muscles, stronger bones and canons less short than its sire, as well as members offering more resistance in broken and undulating country. Such is the *hunter*, the type of all horses for the chase, as the pure blooded stallion is the *true racer*. The body is usually elongated, with an oblique shoulder which lacks flexibility; having the superior rays long, it is not shaped for the leap and jump. Especially destined to move straight forward, it skims the sward and is content with widely opening its compass, whilst but slightly bending the articulations.

CHAPTER IV.

EXTERIOR.

I HAVE no wish to augment the existing difficulties in coming to an agreement upon the qualification of *beauty*, with reference to the horse, and I assent to the following opinion by Rigot. "An animated machine should only appear so far beautiful as, by inspection of its external characteristics, an *a priori* judgment of the good effects it possesses the capacity of producing, can be arrived at. Therefore vigour, force and energy should constitute beauty."

This is in accordance with the signal appreciation daily exhibited by the most expert connoisseurs and even by the dealers. Their admiration is extorted by a horse of beautiful shape, yet, on trying it, they find neither parts, nor depth nor pace ; in a word nothing good : this is what they term a *fine sell.*

Let these remarks be concluded by laying stress upon the authority of Bouley. "In animate bodies, there exists a motor, a principle of action called *nerve influx*, varying in intensity in individual instances, which produces in frames the most defective according to physical law, the most unforeseen effects. As, for example, these horses which according to the popular expression have only instinct. Looking at their external appearance with those small muscles, thin necks, projecting haunches, the ribs which can be enumerated through the skin, the up-turned flanks and stomach, the temptation would be to consider them worthless animals ; but examination of the head, the expression of the eye, the situation of the ears, the dilation of the nostrils, in a word the *facies*, tends to show that everything reveals energy. In fact, when in motion, they falsify all calculations arrived at after inspection of their conformation."

Our object is principally to dilate upon what appeals to the eye, *i.e.* the exterior. It is not absolutely essential that a painter of horses should be a connoisseur in the full acceptation of the term. This can only result from the experience and observation of those who have had many dealings, for useful purposes, with these animals. Practice teaches the qualities, faults, the temperament and the resources which can be extracted.

To summarize : the *beauty* of a horse depends upon the harmony of its proportions, and the *utility* upon a robust temperament, a lively adaptable and nervous constitution and a docile disposition.

The artist must judge by the exterior and will especially rely upon regular conformation, proportions and the perpendicular in order to adhere thereto so closely as possible. He will also note the visible blemishes so as to avoid them. Without being a riding master, it is desirable that he should be a horseman.

It is seldom that a man, who has never ridden, is capable of giving a due account of the attitudes and the seat of the personages in his compositions. So also with the gaits : frequently the eye of the spectator will be inconvenienced by the lack of harmony without being able to explain the cause. This inconvenience might have been obviated by the artist, had the tenour of his instruction relieved him of all doubt ; for it is evident that if, with the knowledge of the exterior, the artist could also become aware of the qualities and defects as well as the temperament and mental faculties which characterize a sound horse, he would attain to a perfection which we are far from exacting from him or his model.

By *exterior* is understood the study of the general appearance of the horse, of the component regions and the divers portions of these regions, namely the head, the trunk and the limbs or more correctly the anterior, the body and the posterior, in considering the saddle horse, which is our especial theme.

The *anterior* comprises (see fig, 1) :—the head (1), the neck (2), the withers (4), the chest (6), the shoulder (2), the arm (5), the fore-arm (19), the elbow (7), the knee (21), the canon (A), the fetlock (24), the pastern, the coronet (M), and the foot (P).

The *body* comprises:—the back (9), the loins (13), the ribs (8), the flanks (12), the stomach (11), and the genital organs.

The posterior comprises:—the croup (14), the haunches (15), the tail (Q), the anus, the buttocks (16), the thigh (17), the stifle (18), the hind leg (20), the hock (22), the canon (23), the fetlock, the pastern, the coronet, and the foot.

I.—ANTERIOR.

We will now resume the detailed description of the divisions which compose the exterior.

The *head* (fig. 26), is evidently the most expressive region of the animal. In its entirety are comprised: the nape of the neck (1), the forelock (2), the ears (3), the forehead (4), the supra-orbit (5), the eyes (6), the cheeks (7), the face (8), the nostrils (9), the mouth (10), the barb (11), the jaws (12), the inferior maxillary (13), the throat (14). Figure 26 represents heads of two Arab horses: A, the mare; B, the horse.



Fig. 26.

The cranium encloses the brain, containing the nervous fluid, which imparts sensitiveness and motion to the animal matter, by the transmission of the spinal marrow and the divisions of the nerves. It is therefore reasonable to insist upon a large cranium as indicative of nerve predominance.

The *forehead* should be wide. In this instance, the superior region, as in the nape of the neck, is decided by the separation of the eyes and ears. In fact, these two organs allow deductions to be drawn as to the expression of the head; their concurrence enables one to judge of the emotions felt by a horse, especially fear and the need of self-defence.

The ears are two acoustic trumpets situated between the forelock, the nape of the neck and the temples. There is usually a tendency to diminish their size and to place them too near. The old masters, wishing to give a full face front representation of a noble animal, brought the points so near together that they appeared to touch one another. In a beast of burden, they indicated a falling ear.

The ear is an organ, the reproduction of the gesture of which—if I be permitted so to express myself—is of the utmost importance to artists. They should make quite a specialized study of its form and direction; for the ear betrays every sensation of the animal.

The attentive ear, at first darted to the fore, (fig. 26), B, then agitated, indicates uneasiness; when the animal persists in letting it droop to the rear (fig. 26), C, it is ready to attack, to escape to the right or left, to bite or to kick, particularly if the head be lowered.

An upright and quiet ear betokens confidence (fig. 26), A, and should be delicate and clean cut, neither too thick nor too pointed. With mares it is often longer and more mobile; the animal should be watchful for its foals, its security lies in flight.

A large ear is heavy and its weight gives it inclination. When its carriage is transversely horizontal, the horse is termed lop-eared. It is *swine-eared* when the ear falls flat to the side. This denotes common horses, with feeble constitutions; at each step, the ears move, like those of a pig.

The ears of a *deaf* horse have little mobility. Those of a *blind* horse, on the contrary, move in perpetual indecision, a mobility which is also characteristic, though in a more convulsive manner, of the skittish horse.

The ear that is anxious and termed that of a *hare*, is

long, straight and close to its neighbour, indicating a narrow nape of the neck.

The ear is called *bold* when its orifice is persistently directed forward, accompanying the look.

Formerly the ears were injured, in similar fashion as the tail, by cropping, They were then designated as *docked*.

The *supra-orbits* (5, fig. 26) are two little cavities below the ears and above the eyes. Placed between these and the temples, they should be slightly apart from each other as the consequence of a broad forehead ; the depressions they form become more hollow with age. A very clean-limbed horse, although young, can show this conformation.

The *eye* should be very prominent and wide open, expressive and soft, under silky long eyebrows so that its gaze may be candid and bold. Apprehension should be felt when it is veiled and oblique, indicative of eyes ill-formed and too deeply set.

The lower the eye with reference to the ear, the more developed is the cerebral capacity.

The *cheek* occupies a large portion of the lateral face of the head. It is limited above by the eye, the zygomatic crest and the face, and makes an anterior extension to the commissure of the lips, posteriorly it is terminated by the curve of the lower jaw. The cheek ought not to be burdened with connective tissue as then the head would be fat and of a common type.

The *face* (8, fig. 26), starts from the forehead and finishes in a point between the nostrils. In order to be beautiful and conducive to respiration, it must be broad. There is a preference for a straight face rather than for one curved, and according to the accentuation of the curve the head is said to be *arched*, *sheep-faced* or *hare-faced*, when the convexity extends from the forehead. I have remarked this last conformation in nearly all Oriental mares. (B, fig. 26).

With the females, this general shape of the head of foals is more persistent than with the males. These latter have the face straight and sometimes even concave, when the head is designated as *camel-nosed*.

Respiratory Organs. The *nostrils* (9, fig. 26) are the

orifices of the aerial passages which directly communicate with the lungs, and indeed it is by them alone that the air penetrates to the respiratory organs. These soft, dilatable orifices undergo considerable expansion, at the same time becoming more circular in order to accelerate respiration in rapid gaits, and they again contract to their normal condition.

A fine and very mobile nasal aperture is generally found with a broad face and capacious forehead.

The *nostrils* (9, fig. 26), by the variation of conformation in the soft skin which surrounds them, form a considerable addition to the animation of the head. They palpitate when the animal is under the influence of fear or anger. The movements of the end of the nostrils and of the upper lip herein participate.

The end of the nostrils (10, fig. 26), the limitation of which is not rigorously defined, is between the nostrils and the lower lip. It is mobile and sensitive; in well-bred horses it is firm and prominent.

The *lips* should be thin, with a fine skin. The *mouth*, which to be attractive should be limited by them, ought to be moderately cloven, and betray all the sentient impressions of the animal by its excessive mobility.

The relaxation of the lips, more especially of the inferior, indicates age, especially if laxness permits the elongation of the teeth to be visible.

The *chin*, a rounded and wrinkled prominence, forms part of the lower lip, just as the end of the nostril is connected with the upper.

The fleshy portion, covered with hair, visible below the mouth, behind the chin, is designated as the barb. It is against this that the curb of the bit makes itself felt.

The *jaws* (12, fig. 26), which should not be massive, are situated on the two sides of the jaw bone. The osseous branches, reuniting to form them, constitute an angle called the *inferior maxillary* (13, fig. 26). The sides should be wide open so as to allow ample space for the first rings of the tracheotic artery, which forms the base of the throat.

Remarks.—On examination of the works of the old masters one is forcibly impressed by the little care which even the best artists bestowed upon the reproduction of

the horse. It is especially in the drawing of the head that these defects make themselves manifest. Thus, until the commencement of this century, nearly all the pictures represent the eyes of horses with human formation and expression, even going so far as to indicate strabism to the detriment of the breadth of the forehead.

The ears areclose together, and render visible a gaping oral orifice, the edges of which are clipped, thus depriving the physiognomy of the animal of not only the bold and refined appearance, but also of its sensitive and expressive mobility.

It will be recollected that when the head of a horse is seen full face, having the orifice of this organ well open towards the spectator, the boundary of the internal portion of the ear is a crooked line, the reunion of which would have its point touching the nape of the neck. The convexity of the external line of the ear presents an uniform curve from the summit to the base (fig. 26, A).

P.-L. Courier informs us, according to Xenophon, that, in the time of this horse-loving general, it was considered desirable to have the ears small and apart at their base in order to impart a more noble aspect to the head of the animal, hence the research for bucephalic horses, which were specially to be found in Thessaly. The horse of Marcus Aurelius, at the Capitol, offers an instance of a broad forehead, reminiscent of the head of an ox, corresponding in all probability with a voluminous brain.

The *face*, in consequence of a not very capacious cranium, is contracted, always arched, the nostrils flat and elongated, insufficiently proximate to the end of the nose, the elongation of which they render excessive. Therefore, the cleft of the mouth terminates at the height of the upper portion of the nostril of which the animal kingdom offers no example, except the solitary instance of the profile of the nose of the giraffe.

The head of this horse is particularly long, because of its leanness. Its lower termination *feigns* a curve concentric to the fleecy convexity of the face and forehead, almost imperceptibly *bowed* so as to feebly indicate the base of the jaw, the shape of which rounds itself without protrusions or visible muscles.

Add to this numerous teeth, set straight as in a

human jaw, and the reader will have before him the olden example, too well known and unfortunately differing widely from the handsome heads the models of which Grecian antiquity has preserved for us. Xenophon desired a small head, and all that he extolled appears indicative of a pony, or at least such as ancient sculpture represents, and which was, in all probability, that small, active and vigorous type of the Olympic and Panthenotic races.

The *neck* of the horse is of great importance to the appearance of the animal. If the upper border be considered, it will be found *long* or *short*, *straight*, *concave* or *convex*.

The neck unites the trunk to the head, and this latter is invariably the means of executing the displacements of the centre of gravity, the paces, as well as the attitudes of defence.

A long neck facilitates rapid motion, especially if it is but slightly encumbered and straight. For a beast of burden it is preferable that it should be short and very muscular.

The neck which is termed *reversed* has its superior concave border, like the neck of a stag, and lifts the head too high to allow complete control of its movements, sometimes exceeding the horizontal; the animal does not then perceive the peril, it *holds its head high* and looks up into the air, the bit strikes against its molars and the animal promptly rears.

The opposite kind of neck presents a curve of the superior border, which, by its convexity, lowers the head and brings it towards the chest. In this case, called *pyramidal*, the animal is generally strong. It is frequently met with among the Spanish and Roman horses. The conformation of the animal thus presenting resistive powers, it arches its neck, and the bit becomes useless as a restraint.

The neck is said to be *arched* when lightly attached to the head with a slight curve, it is a bold and even continuation of the withers and shoulders. When the curve is rather more accentuated in the anterior part, the neck is designated as *swan-like*, and brings the head towards the vertical position approved by the old horsemanship.

The old school having made an art of equestrian exercises, it is perfectly comprehensible that the head of the horse should be tightly drawn back, that is to say, vertical, so that the animal is placed in better equilibrium and more tractable, owing to the horizontal bisecting it by passing across the withers.

In this Baucher agrees with Bourgelat. The type drawn by the celebrated veterinary is thus placed.

We have already noted the great advantage which the horse is capable of obtaining from the balance formed by the neck and head, for the purpose of over-weighting the anterior by lowering them in kicking.

On the contrary, the horse raises it, as well as the neck, to relieve the anterior when *rearing*.

Again it is displaced, to the right or the left, in order to alleviate the side of the limb which progresses to the support.

In a gallop, the horizontal extension of the neck is to the advantage of the propelling force of the posterior limbs.

The *mane* is situated on the superior border. Among well-bred horses it is fine, and not very thick; sometimes long and silky. Among Arabs it often falls to the right.

The large dray-horse possesses a thick, coarse and shaggy mane, which drags the summit of the neck and bends it over to the side. Often the abundance of hair causes divisions and expansion on both sides. In this case the mane is said to be *doubled*. That of the saddle-horse is trained to fall to the left in order to assist the mounting. Fashion decrees that on carriage horses it shall fall on the *right* of the *off-horse*, and on the *left* of the *near horse*.

The mane of the mare is lightened and less bushy. Among stallions it is rather strong, and generally has the muscles forcibly indicated, which makes it appear short. In geldings, the muscles make little projection, and the appearance of the neck is reminiscent of the thickness of the mare.

The *withers* (4, fig. 31), which form the bond of union between the neck and the back, are outwardly discernible by a curve, situated on the superior extremity of the shoulder, and by their deviation according to the varying

magnitude of their elevation above the cartilage of the scapulum. Hence, from successive experiments made by D'Alfort, the professor of anatomy, it is very unusual for beautiful withers to exceed more than seven centimetres, the summit of the cartilage of the shoulder.

The first dorsal vertebræ give their spinous apophysis as the basis of the withers; their crests diminish in length fairly rapidly from the neck, and yet only reach the level of those of the back at the eleventh.

The withers should be *thick* at their base, which is indicative of the amount of the muscles, which should never be emaciated. Too *hollowed* and too *lean*, when the depression of their juncture with the shoulder become over-emphasized, they would in that case be deprived of the elasticity necessary to withstand a shock, or to momentarily counteract an error in the harnessing.

The withers should be *high*, because the more elongated and the more numerous are the composing apophyses, so much the more efficient are they both for the facilitation of the contractions of the neck, as well as for the extension of the hind limbs and the suspension of the trunk.

Withers which plainly and without too much leanness exceed the summit of the scapula are said to be *well-defined.* They should be sought for in the conformation of the saddle-horse, because they make the animal more amenable, and its head lighter.

In this case, the horse being *high in front* and efficiently saddled, it lifts itself easily and throws the centre of gravity to the rear.

If the withers be fat and encumbered with flesh, the animal having the anterior less elevated, is said to be *low in front*; the limbs grow weary, and both saddle and rider slip nearer the neck, as does the centre of gravity.

The *chest* (6, fig. 31) is anterior to the sternum. It forms a continuation of the neck, and is limited on each side by the shoulders and arms. Because of the muscular thickness, its breadth in the upper portion is only slightly dependent on the opening of the first ribs, which in very many instances show but slight variation of their oval shape.

The vigorous draught-horses form the exception to

this rule. The points of the shoulders are further apart, but, above all, the width is furnished with excoriations which *settle into the collar*, these horses progressing with less speed in their motions because they maintain their equilibrium on a larger basis.

The arm should descend from the shoulder, and be situated in the vertical plane. The chest measure is taken *externally* from one upper prominence of the humerus to the other. The point of the shoulder (vertical to the perpendicular) is within this measure of the chest. It may exceed on each side by eight centimeters the limits of its articulation with the arm, the humerus projecting the entire thickness of its anterior tuberosity beyond the scapulum.

We have found forty-six centimeters of chest measurement in a vigorous dray-horse; this measurement can certainly be exceeded. It is, nevertheless, as well to note that the strongest charger submitted to us had only forty-two centimeters.

In our African measurements, taken upon the reproductive stallions of the province of Oran, the chest measurement varied from 35 to 40 centimeters, one horse, 1 metre 60 cent. high, attaining 42 centimeters.

The muscles uniting the chest of a sound horse with the limbs (*ars*) should be well formed and separated by a conformation (*inter-ars*) which in its centre surrounds the *edge* of the sternum, rising in a protuberance in the case of those horses which have the ribs flat, the chest narrowly compressed by the points of the arms and the elbows deep seated. The chest must not be confounded with the breast when allusion is made to its narrowness.

In succession to a fine chest, the xiphoid region behind the elbow and below the ribs is preceded by a well-defined protuberance.

The *shoulder* is especially important with regard to its length and direction; it is the omoplate or scapulum, terminated at the superior portion by a cartilage covered with muscles; this flat and triangular bone does not adhere to the thorax by any osseous attachment, but only through muscles and ligaments, which, by their elasticity, contend against the reaction of rapid motions. It rests upon the highest apophysis of the dorsal vertebræ, while permit-

ting the excession of a length of indefinite magnitude, which constitutes the withers. The obliquity of a fine shoulder facilitates the extension of movements.

The animal being viewed full-face, the direction of the two shoulders against the chest should incline upon the withers, so that the angle they form, with the vertical medial plane, be sufficiently open in the convergence towards its apex.

It is necessary to explain what, in customary terminology, is meant by the word *shoulder*; it is the length comprised between the culminating point of the withers and the region known as the *point of the shoulder* (H E, fig. 31.) The word shoulder, taken in this sense, is a convention for an omoplate long face, at the most 40 centimeters in a length of 60 centimeters (exclusive of the head), limiting this factitious shoulder, which comprises not only its cartilage of 5 centimeters, at the most elevated point of its curve, but in addition 7 centimeters which form an excession to compose beautiful withers with the summits of the dorsal apophysis.

The 8 centimetres which, in a well-bred animal, remain, to attain to the point are the prominent tuberosities of the humerus or arm, outside the scope of the omoplate.

It is extremely difficult to give an accurate account, externally, of this concave base, the attachment of which varies with the obliquity of the shoulder.

The reduction of the superior portion of the scapulo-humeral articulation is the greater because this shoulder inclines in order to diminish the angle of the two bones; the superior prominences of the humerus in that case only become the more apparent. These, together with the longitudinal edge of the scapulum, are the only ones really visible to the artist.

I here take an example within every one's reach, that of *Rainbow*, the celebrated race-horse, the covered skeleton of which is at Alfort's veterinary school. I have studied and measured it. It is of ordinary height and has a very small head, 56 centimeters from the nape of the neck to the teeth. If we measure upon this horse what it is customary to call *the shoulder*, whilst partially taking into account what constitutes it (that is to say from the culminating point of the withers

to the point of the arm) we find withers, 7 centimeters, plus cartilage 5 centimeters, plus scapulum 38 centimeters, plus 6 centimeters of the prominence of the anterior extremity of the humerus, outside its scapulo-humeral articulation. Adding up these figures, we get 56 centimeters, which proves the shoulder to be equal to the head.

Let it be clearly understood that I do not affirm that this is always the case, but I am prepared to certify after numerous proofs, that when comparing the length of the *shoulder* with that of the *head*, one is always very nearly accurate.

In conclusion, I would add that a fine well-inclined shoulder forms, by approaching the horizontal, the scapulo-humeral angle. This, on opening, causes more space to be covered by the anterior limb. The reactions are the more attenuated because the pasterns follow the direction of the scapulum, which augments their elasticity. The English select this disposition of the shoulder for their race-horses.

Arm (5, fig. 31.) The humerus forms the base of the arm ; it is buried in the flesh. Its articulation with the omoplate (designated under the name of the point of the shoulder, and which is better termed the *point of the arm*, since this latter evidently gives it an external indication), imparts a great extension to its inferior portion, which can either approach or retreat from the sternum or even describe a curve. It is nevertheless preferable that the humerus should always move in a plane parallel to that of the axis of the body.

It is in the lower part of the arm that the extensors of the fore-arm make a very marked muscular prominence in front of the elbow.

The fore-arm (19, fig. 31), which has as its base the radius, the direction of which is vertical, articulates itself to the arm, and only closes over the humerus in front; the radius being arrested in the rear by the olecranium apophysis (elbow), it is necessary that the muscles composing the fore-arm be strong and disengaged. The radius should be long in the case of race-horses and short for those with measured gaits.

At about the inferior tierce, and in the interior of the

fore-arm, is situated a horny prominence, designated as the *chestnut* (p, fig. 31.) The *elbow*, or olecranium (7, fig. 31), is the second bone of the fore-arm (cubitus), invariably fastened to the radius. Its direction should be such that it may move in a plane parallel to that of the opposite hind-limb.

The elbow is very important, its length determines the size of the fore-arm, more especially because it will descend upon a very projecting uniciform.

The *knee* or carpus (21, fig. 31), corresponding to the human wrist, comes in succession to the radius, forming the intermediary motive-power which unites it with the canon, by which it is prolonged in a direct line. The multiplicity of carpal bones, forming two layers, has the object of mitigating the effects of the concussion of the limb upon the ground.

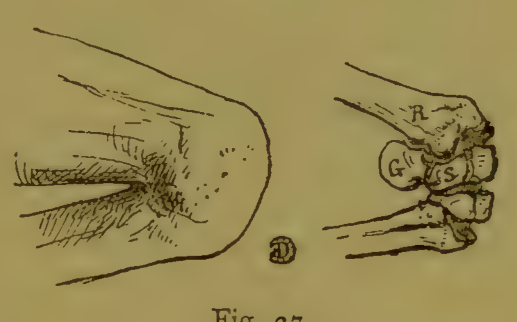


Fig. 27.

The knee should be large and clean, indicating the tendons and bones: almost flat on its anterior face. The base of the uniciform should be indicated by a slight muscular elevation on the posterior part.

The motion of the knee is inverse to that of the fore-arm on the arm, and bends towards the rear, the canon on the radius, at the place known as the *bend of the knee* under the supra-carpal (G, fig. 27). Its extension is very prescribed.

By the width of the knee, its profile from before to behind is understood (A, B, fig. 28), always exceeding the *thickness*, which is taken from side to side (C, D).

When the observer looks at the anterior limbs of the animal, while facing the chest, he will perceive that the external line of the knee (C, E), is more rounded than the internal (D, F), this exterior convex curve limiting the edges of the two layers of carpal bone, making an outward elevation (see fig. 28).

The motor muscles of the canon and those of the feet give little thickness to these articulations, united by the

external and internal ligaments. Therefore it may be affirmed that the thickness of the knee is very nearly the size of the base of the radius, rarely exceeding ten to twelve centimeters.

The bend of the knee is distinctly indicated in well-bred horses and sinewy animals; it is therefore necessary to exactly know the position of the uniciform (G) in order to profile it without hesitation. This can be achieved by observing that this bone has one point of attachment on the base of the radius (R), and the other resting upon the first rank of the carpals (S). Consequently, the superior portion of the bend of the knee, underneath the uniciform (B, fig. 28), will never afford any indication lower than the half of the knee, seen in profile.

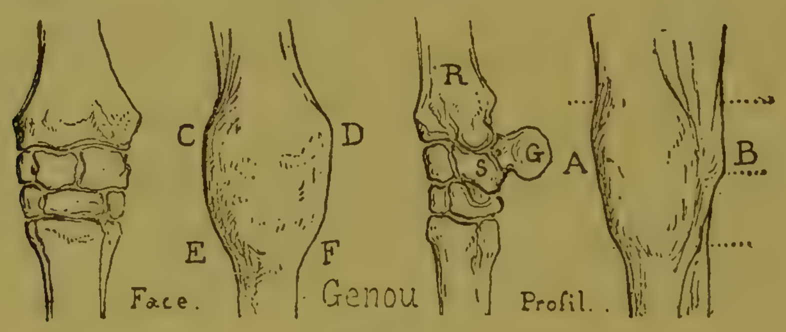


Fig. 28.

The *canon* (A, fig. 31) vertically prolongs the line of the fore-arm and terminates at the fetlock. It is generally short and, in profile, should be wide, strong, neat of outline, straight from the knee downwards, and the tendon which pertains to it, posteriorly, must be detached from the bone.

The *fetlock* (24, fig. 31) is composed of the union of the canon, the pastern and the sesamoids. It should be well-shaped, slightly rounded on all sides, and sufficiently large to support the concussions resulting from its proximity to the ground, whence it receives the first reactions. In the posterior and inferior portion is situated the ergot, surrounded by the fetlock, or tuft of hair, which is only allowed to grow among horses of common races.

The *thickness* of the fetlock is its development as seen from the external face to the internal. Its *width*

is its profile (A, B, fig. 29), from the anterior part to the sesamoid bones, inclusive.

The fetlock (A, B, fig. 29) bends like the knee, and can close the pastern at the rear of the canon almost at a right angle.

The *pastern* (P), first phalanx (fig. 29) makes, with the metacarpus, an obtuse angle in front of the canon. Its oblique direction mitigates the shock of the foot upon the ground ; it should not be too long. Its inclination is variable. Writers agree in their preference for that of forty-five degrees.

The *coronet* is the bond of union between the skin and the wall of the hoof to which it gives the proper contour in its superior portion. Its border is not very projecting, and its rounded conformation becomes intermingled in the rear with the heel. It is the superior portion of the second phalanx prolonging the first in the same direction.

The foot (S), nail or horny box, known as the *hoof*, terminating each limb comes in contact with the ground and there leaves a trace more or less rounded. It has, as its base, the third phalanx, the pedal bone.

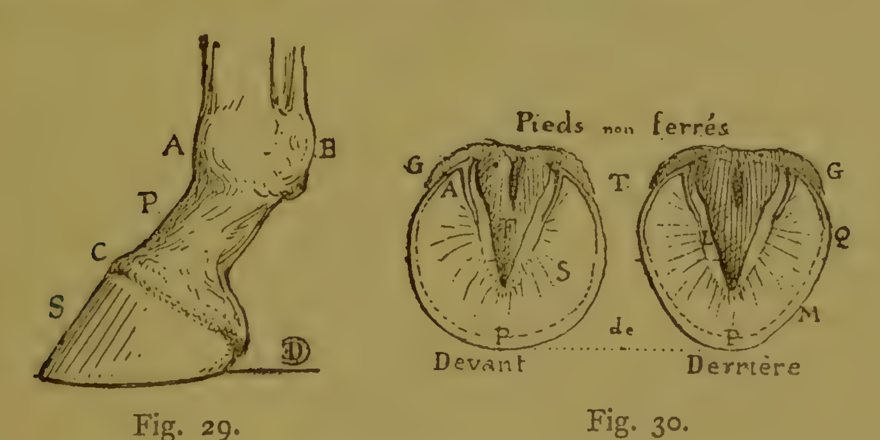


Fig. 29. Fig. 30.

The *hoof* (S, fig. 30) is externally composed of the *wall or paries*, a horny curvated plate, which occupies the inferior portion under the name of the *sole* (S, fig. 30). The anterior portion is known as the *toe* (P). The lateral *faces* are the *mamae* (M), then the *quarters* (Q), and the heel (T).

In the posterior portion, the wall curves upon itself in *buttresses* (A), which limit the points of the sole and

leave a *lacuna* (L) between them and the frog (F), a body having the shape of an elongated V in soft and elastic horn, which mingles with the *glomes* (G), covering the heels, situated at the posterior extremity of the foot. The top of the hoof is circumvented by a *perioplic* horned band, which is attached to the glomes (G, fig. 30).

We are of opinion that it will be beneficial to make some observations on the shape left by the exterior outlines of the prints or trails of a horse which has never been shod. This mark of the sole of the fore-foot is round, and within its circumference can be inscribed the hind. foot, which makes an angle rounded at the toe, and of which the diameter is often less than that of the first. The following is the explanation of this difference in the shape.

The posterior limbs are the principal agents of impulsion, which they transmit from below upwards directly into the trunk, by the manner of their union with the vertebral column, and this the more vigorously that they are engaged under the mass of the body with the fewest points of contact. The pointed formation is evidently that which unites the largest impulsive force ; the energy is determined by the depth of the print on the ground, when the utmost detention occurs. (See T, P, G, fig. 30, hind foot.)

The rôle of the fore-foot is to react, and to do so with moderation, without violent disturbance of the principal vital organs, which are situated as though suspended under the anterior limbs. With this object, they unite themselves to the chest by elastic and gentle suspensions. And the set-down, however violent it be, only reaches the ground at the *appui*, attenuated by the suppleness of the pastern fixing itself at numerous points of contact on a large rounded surface. (See T, P, G, fig. 30, fore-foot.)

II.—THE BODY.

The *back* is next in succession to the withers (9, fig. 31). It is composed of twelve vertebræ, termed the *dorsal*. This is what supports the weight of the rider. It should therefore possess suppleness as well as a certain rigidity, and the horizontal direction is regarded as the

best. It becomes laterally round from the apophyses of which the line of the summit should be slightly bent inwards without this groove being sensibly apparent.

The back, above the ribs, generally presents a downward curve, which, if the concavity be too prominent, causes the animal to be designated as *hollow-backed;* contrariwise, if the dorsal spine is convex or arched, the horse is said to be *roach-backed*, and especially adapted for bearing burdens, being defective in the flexibility required in saddle horses.

A *dipped back* is one which descends in a straight line from the summit of the apophyses of the lumbar vertebræ, the internal angle of the hip, to the base of the withers, a line the more inclined since the croup has a marked

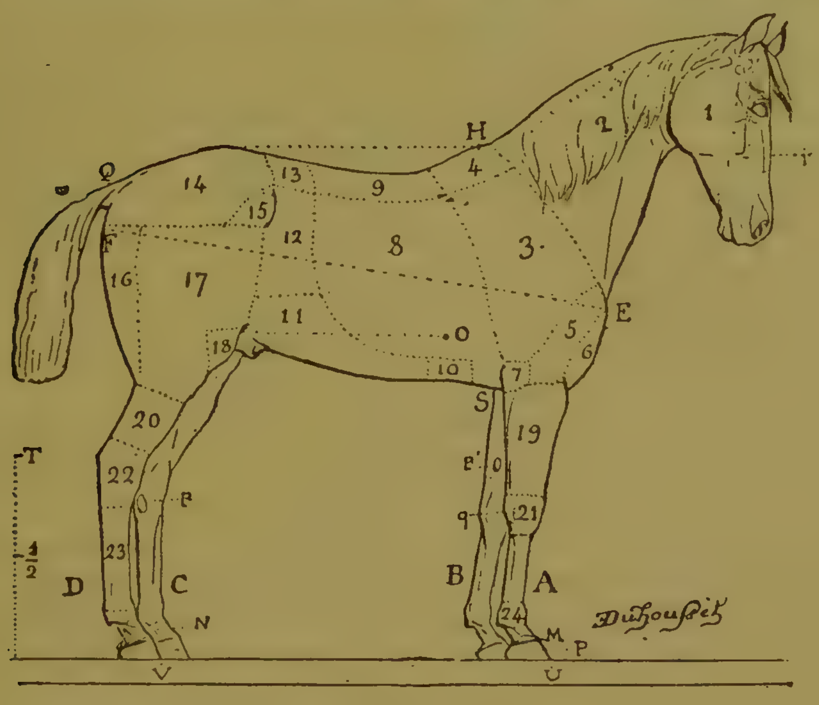


Fig. 31.

elevation above the withers, as is often seen in race-horses, with whom this conformation accelerates the movements of the fore limbs, constantly seeking to alleviate the unequal distribution of the body weight entailed on the anterior, by this motive power coming from the posterior limbs.

Loins (13, fig. 31).—The lumbars follow the back in a straight line. This is what is designated by the term

loins. The composing vertebræ should be short, so as to centralise with the more resistance the impulsion which the posterior members transmit, by their intermediary agency, to the vertebral column and the anterior. The loins, although short, unite transverse, horizontal and well-muscled apophyses. This renders them wide, whilst preserving a certain mobility.

Mal-attached loins are those which do not follow the back in a straight line, but become arched before reaching the sacrum (a fact which has to be recognised when desiring to increase the stature of Arabs). If the crest of the back follows it, and becomes markedly prominent, the loins are *double.*

The lumbar vertebræ are six in number; nevertheless, Oriental horses often only possess five. The loins should insensibly continue the back and rejoin the croup without any vacillation or depression of the line.

Breast and ribs (8, fig. 31).—The ribs, to the number of eighteen pairs, limit the breast, and laterally constitute the round portion of the body. They commence with the origin of the vertebræ of the withers and back; the largest arc being situated about the twelfth rib.

The first nine pairs, called *sternals,* are situated immediately upon the sternum, the best capacity being the cylindrical. The breast, limited by circles, is found in the most favourable condition of width, consequently the flat rib, of an oval form or even longer, is not generally a sufficient compensation. A narrow-chested horse with crowded limbs will be scant of breath. The actual *height* of the capacity closing the respiratory organs and the heart, is, vertically, from the sternum to the vertebral column under the withers. Its *depth* or length is measured horizontally from the anterior portion of the sternum, under the neck to the diaphragm.

The height of the chest, taken from the withers to the sternum is not, therefore, the absolute index of great pectoral capacity. The apophyses of the dorsal vertebræ are there often more than 20 centimeters in height, a length especially advantageous to the shoulder and the muscular forces which make it act.

I have ascertained, in the collections of several German veterinary schools, that Arabs have the ribs rounder than

the English horses, but these often have a finer fall under the elbow, and the chest appears higher than it is broad

Pulmonary power must be posteriorly sought above the xiphoid region and the breadth limited by the ribs which protect the base of the lungs.

The *stomach* (11, fig. 31) extends from the xiphoid region to the genital organs. It should not be too voluminous (cow), nor too small and drawn-back (hare), which occurs when the abdominal muscles become contracted owing to disease or insufficient nutrition.

The *flank* (12, fig. 32) is under the lumbars. and touches the stomach, ribs and haunch; it regularly follows the phrases of respiration. The flank should be neither tucked up nor hollow. It is called *corded* when it possesses a muscular prominence joining the haunch to the ribs. The posterior prolongation of the curvature of these last ribs can considerably diminish it. Race-horses present this conformation.

The *genital organs* of the male are the scrotum or tunics which envelop the testicles. The removal of these latter causes a horse to be termed a *gelding*, that is, emasculated. The *penis* is contained in a sheath in which it moves freely. In the female, the *vulva* is situated immediately under the anus, and the mammae are appendances of the stomach, approximately at the height of the stifle.

III.—POSTERIOR.

The croup (14, fig. 31) is between the loins and the tail, situated in the superior portion of the body, dominating the haunches, thighs and buttocks. For a saddle-horse, it is desirable that it should be straight and relatively long; width is preferable for a beast of burden, and especially for breeding mares. A long croup diminishes the flanks and renders the loins thicker. When it is straight the muscles of the buttock are longer; when thick it is often *double*, and the line of the vertebræ will bury itself therein. If this line be prominent it is termed *sharp*, and, in this case, has an inclination to the side of the haunches and the point of the buttocks, it is then said to be *cut-off* and *low*.

The *ilium* is the anterior portion of the coxa, resting upon the *sacrum* by its internal angle indicative of a prominent tuberosity. Its external angle constitutes the *haunch*. The *ischium*, or posterior angle, terminates the croup; this is the limitation termed *the point of the buttocks (*F, fig. 31).

A short croup affords little extension to movements, and has a contracted appearance. Usually, the croup presents a gentle inclination from its culminating point (the internal tuberosity of the ilium) to the buttock. The *tail* (Q, fig. 31), is next to the croup, and covers the coccygeal bones. The *attachment*, the *stump*, and the *hairs* all obtain attention. With Oriental horses, who often have the croup straight, the attachment of the tail is high, the stump horizontal and quite distinct, the hairs fine and pendant like a plume; in a word, a *tail of trumpet form*, a handsome bushy flowing tail, which it is sometimes necessary to cut at the height of the fetlock.

A tail which offers resistance when a man lifts it up or draws it towards him, is a sign of vigour. This ornament of the horse has not met with much respect, and has had to submit to the exigencies of fashion. For example, amputation has been practised close to the stump, making the tail like *a broom*, or *short*, *cropped* or *docked*.

The tail said to be *docked in the English style* consists of an excision with the loss of the substance of the depressor muscles.

Nicking, a French operation, is merely an incision without loss of substance.

Common horses, with sunken croup, have their tails low and adhering to the buttocks.

Why, in former times, was not the luxury of an entire tail preserved to the horse, constituting as it does, not only an ornament, but in summer a most useful fly-flap? The reason was that in winter, at the epoch when equestrian travel was the ordinary mode of locomotion, it was a source of considerable discomfort to the rider. In fact, the long tail absorbed the rain and became burdened with the mud of the road, which by its perpetual alternate motion, was thrown in every

direction. In all probability, to this cause must be attributed the custom of not allowing it to exceed the hock.

The *anus* should form a rounded projection, and should thoroughly close the orifice of the intestinal tube; under it is situated the *perineum*, which extends to the genital organs. It is a band of very fine skin between the two posterior members. The medial line of the perineum is termed the *raphé*.

The *haunch* (15, fig. 31) is the angular and exterior portion of the ilium, laterally situated in the rear of the flank, and touching the thigh. There must be sensible evidence of its presence; but yet it must be rounded and not prominent. If the latter, it is said to be *too angular*, and can be seen in a horse which has too oblique or too large a croup.

The *buttock* (16, fig. 31) is situated at the extremity of the animal, inferior to the croup, posterior to the thigh and superior to the leg. It falls upon the calcanean cord, should be long, and as straight as possible, with wide hard muscles. In this case the buttocks are *well furnished* and the horse is *well rumped.*

In emaciated animals the buttock is distinguishable from the thigh by an accentuated groove, termed the *parting of misery.* In a vigorous horse this separation has but slight indication.

The turf and the razing gaits necessitate for the horse the possession of a powerful muscle of the buttock, the curve of which, descending from the points of the ischiums, obliquely rejoins the leg. This is the result of a long femur which permits movements to possess both rapidity and extension, a conformation frequently to be found in English horses. This variation of the length of the femur on the tibia causes the buttock to appear more or less descended and straight, for in all horses the muscular attachments are identical.

In the case of horses of the *manège* and *haute école*, with elevated and measured gaits, the curvature has greater convexity.

This same particularity is found in a yet more apparent manner under a great mass of muscle in heavy draught horses, with whom all this force is expended in slow progression; the buttock then appears cut.

Animals with a tendency to be *under themselves behind* possess the limit line of the buttock presenting the peculiarity.

The artists who draw horses often cause the intersection of the muscles of the buttock with the leg to fall over much, which obliges them to exaggerate the extent of the stifle as well as the length of the *fascia lata.*

Avoidance of such self-deception can be attained by the consideration that, in profile, the limitation of the curve mentioned—its point of contact with the calcanean cord—is approximately at the same height as the insertion of the fascia lata under the crest of the tibia.

Another check which may be indicated is the comparison of the posterior with the anterior, being aware that the stifle or patella is at the same distance from the ground as the point of the elbow when the horse is in exact stationary position. Thence, it is easy to take into account the inferior limitation of the buttock, stopping rather above the articulation of the femur and tibia. It will be found at approximately the same distance from the ground as the sternum, situated some centimeters lower than the point of the elbow (*oleocranium*).

The *thigh* (17, fig. 31) is generally confused with the buttock, in front of which it is situated in succession to the flank, above the leg, having the *femur* for base. Its articulation in the cotyloid cavity imparts motion to this portion of the member, rather in the sense of the length of the animal than otherwise. The muscles of the thigh should be long, prominent, and firm. The internal portion or flat of the thigh presents a more united surface.

The *stifle* (18, fig. 31) is below the thigh, in the superior anterior portion of the leg. It covers the patella, and corresponds with the human knee. It is important to indicate its *fold*, the cushion uniting the posterior member to the stomach.

The muscles attached to the patella, being of considerable importance in the extension of the leg, transmitted by the femur, impart to the stifle, which is the consequence, a rounded and absolutely limited form, which it is necessary to exactly locate ; it is the prolongation of the femoral radius, which, to be satisfactory, should be long and at 45°. It has been previously

observed that the elbow and stifle are at approximately the same distance from the ground—a fact which must not be forgotten.

The *leg* (20, fig. 31), often confused with the thigh, which it follows, has an oblique prolongation from the fore to the rear, from below the stifle to the hock : it has the tibia for base : it articulates with the femur under its inferior tuberosity and only moves in the rear to close over this latter.

A strong, sinewy and long leg will provide a strengthened and lively gait. If the leg be muscular and short the horse may be very excellent, more especially for the *manège.*

The leg and the forearm, to which it corresponds, are constantly in opposition : the tibia causes the upward and forward progression of the body. The radius reacts by moderating and attenuating the motor force. These two bones are of equal length.

The *hock* (22, fig. 31), the point of which corresponds with the human ankle, is the inferior portion of the tibia (bone of the leg), and rests upon the six tarsal bones and the head of the posterior canon. In the transmission of motion, and as offering the first opposition to the resistance of the ground, this is the most important region of the animal.

This articulation should be hollow and dry : its width is measured from the anterior border, or *fold*, to the posterior extremity or summit of the calcaneus, known as the *point of the hock.* The limitation of its thickness (G, H, fig. 32), is the inferior tuberosity of the tibia.

The hock has two faces : the *external* (G, K) and the *internal* (H, L). *The tendinous cord of the hock*, or the *calcanean cord*, is the name given to the assemblage of tendons of extensor muscles which, profiling the posterior portion of the leg, arrive upon the tuberosity of the calcaneous (M), turn around it thence, to fall like a well-detached cord in a straight line, behind the canon to the fetlock. In its superior portion, namely, at its juncture with the hock, the calcanean cord isolates itself from the muscles and from the bone of the leg : this depression should be strongly indicated : it is called the *hollow of the hock* (see fig 34).

It cannot be too strongly impressed upon those who represent horses full-face, and consequently see the hocks according to their thickness, not to make the base of the tibia stronger than the base of the radius limiting the thickness of the knee, for the tibia (G, H, fig. 32) in a healthy condition is, at this place of articulation, of the same size as the radius, or even less, a singularity the more deserving of attention in the instance now being treated because the legs are in perspective. I have been frequently compelled to notice this lack of veracity in drawing.

These osseous heads of the superior portions of the knee and hock, very apparent when the animal is seen from the front or the rear, are at a slightly greater altitude from the ground on the internal face (H, L) than the exterior (G, K). The explanation of this trifling inequality is that the tibia and the radius have a slight inclination from without inwards, from the articulation which binds them to the body, the one to the femur, the other to the humerus.

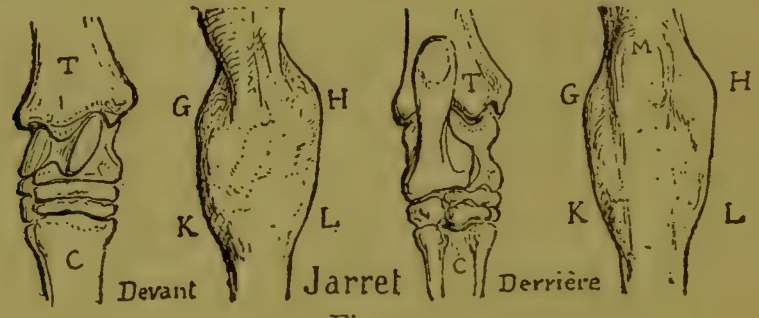


Fig. 32.

The artist usually represents the *charger*, or *hunter*—in fine, the *saddle horse*—from which are demanded gentle reactions ; for this type it is, therefore, necessary to avoid portraying the hock too straight while retaining the largeness of its fold at the point, with a clearly-detached tendon, and avoiding a lapse into the opposite excess of closing the angle of the hock, which would predispose the horses to measured gaits.

The representation of the racehorse necessitates an open and straight hock, especially capable of imparting impulsion in a horizontal direction, almost skimming the ground to *carry out the gallop at full speed*, making full use of all force lengthwise, and only just rising sufficiently from the ground to attain this aim.

By forcing this opening of the hock, the horse is in the attitude which is called *camping*, as will be explained later.

The horse intended for the *manège* and tournaments has short gaits, often upon place; there should be no hesitation about the slight diminution of the superior rays, nor of bending or lightly closing the hock, the energy of which will in this case be exerted in an upward direction with great force; nevertheless the reactions will be more moderate and the speed facilitated, as well as the leap, if the exaggeration be avoided that would occasion the remark that the horse *is under itself.*

In the representation of a handsome stallion, let it have wide hocks, long and vigorous muscles of the croup, the loins short, and so to speak double; one should feel it is natural for it to rear. Let the anterior be but slightly weighted with flesh, in order to assist its displacement, so that the preparation for the duty demanded of this horse may be easy. This is the primary condition for the energetic accomplishment of his reproductive task.

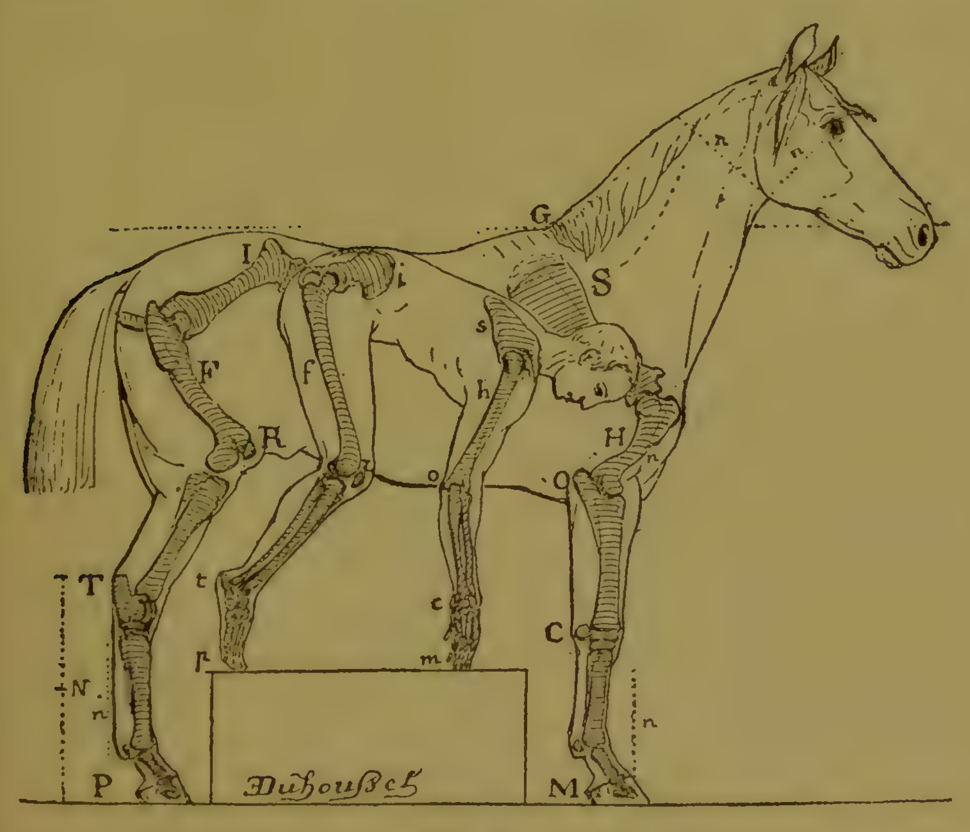


Fig. 33.

This chapter will be concluded by placing before the reader fig. 33, representing the corresponding portions of the horse and the human skeleton. The idea suggested by Garsant in 1769, in his "New Complete Farrier," is here clearly set forth with the exact proportions of the horse in order to render it more comprehensible.

The letters of this figure should be thus interpreted :—S, scapula or shoulder of horse,—*s*, scapula of man.—H, *h*, humerus (arm).—O, *o*, olecraneum (elbow).—C, *c*, carpus (wrist).—M, *m*, sabot (finger).—I, *i*, iliac bone (pelvis).—F, *f*, femur (thigh).—R, *r*, patella (knee).—T, *t*, os calcaneum (heel).—P, *p*, foot.—O, C, *o*, *c*, forearm.—R, T, *r*, *t*, leg.

CHAPTER V.

BLEMISHES.

Blemishes are the osseous excrescences or tumours which are to be found arising in the vicinity of articulation detrimental to motion, and so depreciatory to the animal. Some of these blemishes are hereditary.

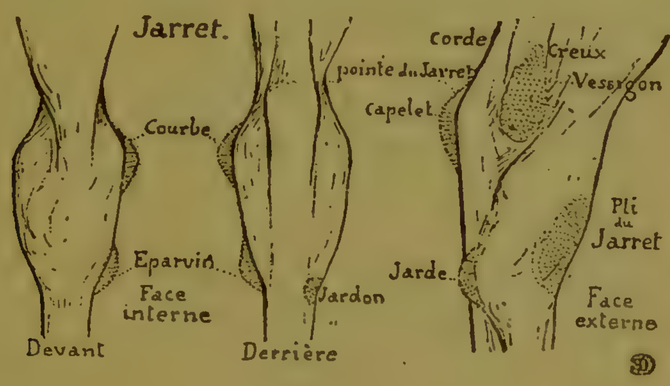


Fig. 34.

Osseous or hard blemishes are: the *spavin* on the internal inferior face of the hock. It is an exostosis on the internal fibula at the superior portion of the head of the canon. In this case it is termed *hard.* That which commences with a tumour, not as yet ossified, is called the *ox-spavin* (*éparvin de bœuf.*)

The curb, osseous blemish, is situated at the base of the tibia, in the internal superior part of the hock.

The *jarde* is an osseous tumour at the inferior portion of the hock, or the head of the external fibula. When the exostosis makes a posterior protuberance and falsifies the line of the tendon by the convexity of its development, it is designated by the name *jarde.* Both in painting and sculpture, antique artistic productions have this blemish very prominent. Phidias is, I believe, the only one who knew how to avoid it in his lengthy series of bas-reliefs of the Parthenon.

One might be led to believe that, in olden days, this

abnormal development of fibula was esteemed a beauty of the hock. At the present time it is justly expected that the flexor-tendons of the phalanx should descend in a straight line from the point of the calcaneum to the posterior side of the fetlock.

The *soft blemishes* of the hock are *windgall*, tumour swollen by an effusion of synovia which is found in the hollow of the hock in its inferior position anterior to the calcaneum. When it exists on both sides it is *branched*. When on one only, it is *simple*.

The windgall in the fold of the hock, and within, is more serious because it is articular.

The *capelet* develops around the point of the hock, and is often a synovial accumulation. In that case the swelling is mobile, and forms a cushion rounded in a pellet.

The saphenic vein, on the internal portion of the hock, is sometimes affected by irregular dilatations of its line; these are *varicose veins*.

The anterior limb can show at the knee an enlargement, named *osselet*. Osseous blemishes take the name of *splints* on the anterior and posterior canons.

Windgall is a soft tumour formed by a synovial accumulation above the fetlock, and on each side of the pedal flexor tendons.

Exostoses can locate themselves on the coronet, on the anterior face, or even on the entire circumference; these are *ring-bones*.

Malanders are fissures in the fold of the knee. Those of the hock are called *sallenders*.

A hock deformed with tumours is said to be *capped*.

All the blemishes, hard or soft, just enumerated in the above summary, are only serious when they impede the motions of the horse. They should, therefore, not otherwise receive too much attention.

For the eye it is different. It is essential to be thoroughly familiar with their situation in order to avoid their portrayal should they exist, and more especially not to invent them through ignorance of the accidental or permanent defects in a horse, or through lack of knowledge of its physical formation, which would render liable the multiplication of the faults in the constitution of those portions, the reproduction of which is desired.

CHAPTER VI.

PROPORTIONS.

When addressing artists, it is in the highest degree necessary to support the rules committed to memory by a description of the relationship to one another of the portions which compose the animal. Each region must be limited by a visible outline, and the task undertaken of affording the most approximate indication of the connection existing between them.

The proportions, in art, are not mathematical; the equality of the portions constitutes their equilibrium. Symmetry compares all the details among themselves, thence to form a whole, not only conformable to an absolutely natural model, but to the one which unites the perfections.

Art is the realisation of the type of this selection.

Mathematical measurements are only the means by which the truest proportions are authentically ascertained. They form the basis of the *correct ideas*, which are indispensable, because drawing has to give to each object the outline which determines the attitude in the exact appearance of a subject (which is diversified to infinity by nature) for the maintenance of the natural equilibrium in every variety of situation and movement.

There is nothing absolute in nature; the word proportion should, therefore, be here understood only in a relative degree. A learned author, in discussing this subject in a book especially devoted to it, said that a numerical indication of proportions was not only both difficult in enunciation and impossible in appreciation, but also of questionable utility.

How many writers might be quoted, even within the compass of my recent reading, who deny all application of comparative measurements on the horse, by writing :

"Never can such or such a portion be too large, too broad, too high to be beautiful." It is my duty to state with precision, for the reader will not be satisfied by the mere utterance of vague opinions. Others went too far in the direction opposed to Bourgelat's system of measurements. He, however, depreciated the practically applicable portion of his observations by becoming involved in details impossible to recollect and difficult to verify.

I shall therefore endeavour to be clear, and, as far as may be, descriptive, in order that the eye may quickly perceive and thoroughly comprehend my observations. Necessarily, they must be connected with the muscular bed, upon which the skin of the animal is animated and moulded. I shall even pursue investigation as far as the rigid frame of the skeleton, the osseous heads of the different regions of which, often apparent on the exterior, attract our attention because of the useful instruction they can impart.

I shall endeavour to indicate the principal portions, and the deductions which can be made, by comparing one with another, in order to remain within the limitations of veracity, relying upon nature itself.

It is necessary to see and to compare in order to acquire that exactitude of eye which is essential for the draughtsman undertaking the difficult study of animals. From experience, confirmatory of theory, the artist will obtain the benefit of tuition about the exterior of the horse through especial attention to all which is indicative of a good conformation, strength and aptitude for the different gaits.

The information which I shall endeavour to impart will merely serve to guide further observations. I do not say it is necessary that all the measurements here set forth must be found on any horse which is beautiful, but I do affirm that I have personally found them on a very large number of horses, and that in employing them the artist will not stray far from the truth.

The very numerous measurements we have taken in Asia, Africa and Europe, with instruments easy to manipulate, permit the confident assurance of the exactitude of the hippometrical experiments which will be cursorily indicated.

It may be as well here to append some explanation with reference to the selection of the head of the horse as the unit of measurement. This decision arose from the necessity of finding the best-defined and most applicable method of measurement.

About a century ago (1785) Vincent wrote on the subject, pointing out to Bacheliez, professor of the academy of painting, that this selection was a reminiscence, dating from the ancients, who had taken the human head for the purpose of measuring the rest of the body. As a matter of fact, no length is better limited and more suitable to serve as a basis for comparison in each individual case and for a positive value in the total length of the scale pertaining to the individual.

Animals, like men, present variations of form attributable to the soil, nutrition and habits. Thence should be drawn the deduction that an animal which is perfect in the dimensions of all portions of the body, as is desired, would be an ideal type, the beauties in detail of which are scattered in the mass of individuals. Naturally, the one uniting the greatest number attains nearest to perfection.

But the matter ceases to be ideal if by far the larger number of subjects examined present the special dimensions of a selected fraction, and that constantly in the same relation to some other measurement of another portion of the same individual. It is this repetition, found in a very large number of experiments, which permits me to positively assert, in agreement with our first masters, that the length of the head is always the best comparative unit.

When measuring a horse, it is preferable that it should stand in a natural position, namely that the direction of the head should be parallel to that of the shoulder, a parallel which should be again found in the pasterns of the anterior members, in the same way as the inclination of the femur is that desirable for the posterior pasterns. I am speaking of an animal in a free position, not compelled either to assume a pose or to be gathered together.

A photograph, of which I have copied the profile, will serve for my demonstration. The animal is as high as it is long.

Our comparative unit, the *head*, is again found almost

exactly in its length, from the back to the stomach (N,O), at a tangent and with the thickness of the body: from the summit of the withers to the point of the arm (H,E); from the superior fold of the stifle to the point of the hock (J′,J); from this to the ground (J,K); from the superior extremity of the scapulum of the rib of the dorsal angle to the point of the haunch (D′, D).

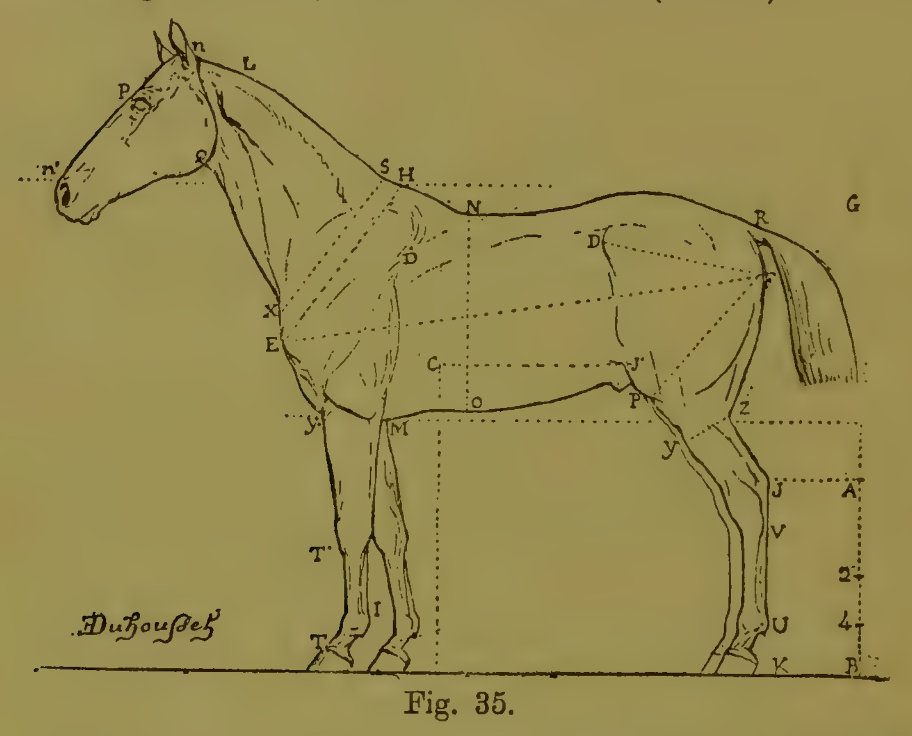


Fig. 35.

From the sternum to the fetlock (M, I); above this for great horses and racers; in the middle and below for small and ordinary horses.

Two and a half times the head for the height of the withers (H) from the ground: from the summit of the croup to the ground: very frequently also from the point of the arm to that of the buttock (E, F) (length of horse), although for a long time past the type of Bourgelat has been regarded as a conventional model, short and massive. The drawing presented, which is $2\frac{1}{2}$ heads in height and length, is that of a horse often found.

The croup, from the point of the haunch to that of the buttock (D, F), is always shorter than the head; this varies from 5 to 10 centimeters. The breadth of the croup from one haunch to another often does not much exceed its length.

The croup, as it has been just limited (D,F) can also be found with sufficient exactitude, as far as length is concerned, four times on the same horse, namely, 1, from the point of the buttock to the inferior portion of the stifle (F, P).—2, As the width of the neck, a little in advance of the withers, a little above the point of the arm (S, X).—3, From this last point above the lower jaw (X, Q), when the head is naturally placed parallel to the shoulder (E. H).—Finally, 4, from the nape of the neck to the nostrils (*n*,*n′*).

In the corner of Fig. 35, A, B represent the length of the head; B, 2, the half; B, 4, the fourth; B, G, is a vertical from the ground, equal to that of the withers H.

The measurement of the half of the head will also be a very useful guide to the construction of a horse, when it is known that it is frequently applied in several portions, namely (P, Q); from the forehead, above the eye, perpendicular to the tangential line of the jaw—2, profile of the neck to the level of the base of the head (q, L)—3, from the coronet of the fore-feet below the knee (T,T′)—4, on the hind legs from the base of the fetlock to that of the hock (U,V)—5, finally it is about the length of the humerus from the point E to the radius.

It was the picture representative of averages in the "Physiology" of Colin, giving the dimensions in length of the various rays of the members in the domesticated mammifer, which gave me the idea of applying the half of the length of the head to this measurement of the arm-bone, which the professor estimates at 31 centimeters, The measurement of the head, in the majority of cases, being 60 centimeters, I believe I am approximately accurate in indicating it.

In fact, in a list of observations with appended figures, relating to fifty African horses, from 1 meter 44 centimeters in height, and in which only one attained 1 meter 60 centimeters, we find :—

17	horses having	60	centimeters	length of head.
10	"	59	"	"
9	"	62	"	"
8	"	58	"	"
5	"	61	"	"
1	"	63	"	"

With reference to those fifty horses, let it be added that:—

26 were less long than they were high.
14 equal in height and length.
10 were longer than they were high.

I lay the more stress upon the measurement of the arm with reference to the head, because neglect of taking this into account has caused the commission of grave errors, both in former times and at the present day.

All the bas-reliefs of the Parthenon have horses, the humerus of which are too long, and this is an absolute anatomical defect; for, if objection be made because of the necessity of augmenting the arm, owing to the obligation of placing the subject at a higher elevation with reference to the spectator, it would be equally imperative to magnify the neck and thicken the heads of the animals for the same reason, which has never been done, and should therefore give additional weight to the observations I here make.

It is not necessary to go back as far as Albert Durer to discover abuse of the development of the chest, both in size and height. Sculptors and painters of horses in the last century, and even Gericault, placed the point of the arm far too high, for in nature it is found at about the level of the superior portion of the sternum.

I have always been forcibly struck by the frequency of the equality of the vertical of the withers with that of the summit of the croup from the ground. Sufficient stress has not been laid upon this in the treatises upon the exterior of the horse. I have discovered that the reason is to be found in the difficulty of appreciating, off-hand, these two distances without recourse to the metrical sliding-rule.

This optical error arises from the obliquity, lowered from the culminating point of the withers at its intersection with the back, being very short in comparison with the one starting from this latter point to rejoin the summit of the croup. This latter, having a gentle slope, has not the appearance of attaining so elevated a point.

It should be mentioned that when the vertical of the withers is higher, the horse easily carries its rider, the

shoulders having more freedom and the neck being lighter. The equality of the two verticals balances the forces of the anterior and posterior. Finally, if the vertical of the croup be elevated, this augmentation imparts greater animation to the progression of the horse by favouring the muscles of this portion, as is most frequently to be found in horses of noble gaits.

A horse is said to be good in the upper portion when it has an unbroken curve from the neck between the withers, back and croup ; good in the lower portion when the lines of the members harmonise.

When these two conditions of the upper and lower portions are found together, they are said to make a handsome and well-proportioned animal. In the opposite case the animal is disconnected.

It may be thought that the prescribed measurements are only applicable to the Oriental horses, which are usually inscribed in a square, *i.e.*, their length does not exceed their height. I can positively assert that these measurements occur far more frequently than would be imagined even in the English race-horse, long reputed to be and always represented as though deformed in the dimensions of the croup and the smallness of the head. This is a phantasy which may be fashionable, but is unworthy of serious discussion.

I have often measured race-horses, and, according to my experiments, the length of the point of the arm to that of the buttocks invariably lies between two and a half heads and two and three quarter heads, even in English horses said to be *long*. It is many years since I first learnt mistrust of exaggerations drawn under the pretext of sketches made from nature.

Fortunately for the due consignment of these artistic perpetrations to their proper position, we possess a great number of photographs : the animal is clearly visible in profile, and photographic perspective, in this pose, never attenuates either the height or length, which permits the verification of the exactitude of these dimensions and the deduction of mathematical consequences conformable to the truth. This is a study placed at the disposition of one and all.

It is clear that if the length of the horse were caused

by the obliquity of the shoulder making the withers retreat to the rear, a great depth of chest and an extensive croup, indicative of the vigorous strength of so fine an anterior, the animal would be pre-eminently long; but, in reality, it is nearly always the elongation of the loins alone which is productive of the few centimeters in excess which distinguish the horse said to be *long* from the one the height of which is equal to its length.

It is an error to believe (most probably from having heard it so often said) that the race-horse is an exception to this law. Many measurements upon winning racers prove the contrary.

Not to trespass upon the patience of the reader, I will only quote one example. I take up by mere chance a list containing a summary of experiments. In forty instances which were measured, I find thirty-seven race-horses in each of which the height was found to be the length, and only three (Dick, Monarch and Ralph) were longer than they were high, whilst out of the thirty-seven, there were nine which were higher than they were long.

Nothing is more easy than to fall into error in a superficial estimation. As a proof, I place before the reader a drawing of two horses (fig. 36). The first is the copy of a photograph, exactly two and a half heads high, in the double sense, both of height and length. The second is this type only elongated by the quarter of the length of the head.

It is clear that the first horse will seem short, but the second will always have the appearance of a long horse. Nevertheless, verification with a pair of compasses will show the exactitude of the very trifling difference above mentioned. Thence may be easily imagined the different effect upon the eye if the second horse had three heads instead of two and three-quarter heads, as length in comparison with the height.

I should therefore say that it will need long practice to obtain the capacity of eye of a true connoisseur who has to take everything into account in order to arrive at an adequate view of the horse, that is to say, to be capable of competently judging it.

The painter, being once warned, will augment or

diminish, at his own responsibility, such portions as he may consider it necessary to alter for the purpose of imparting more style to his composition.

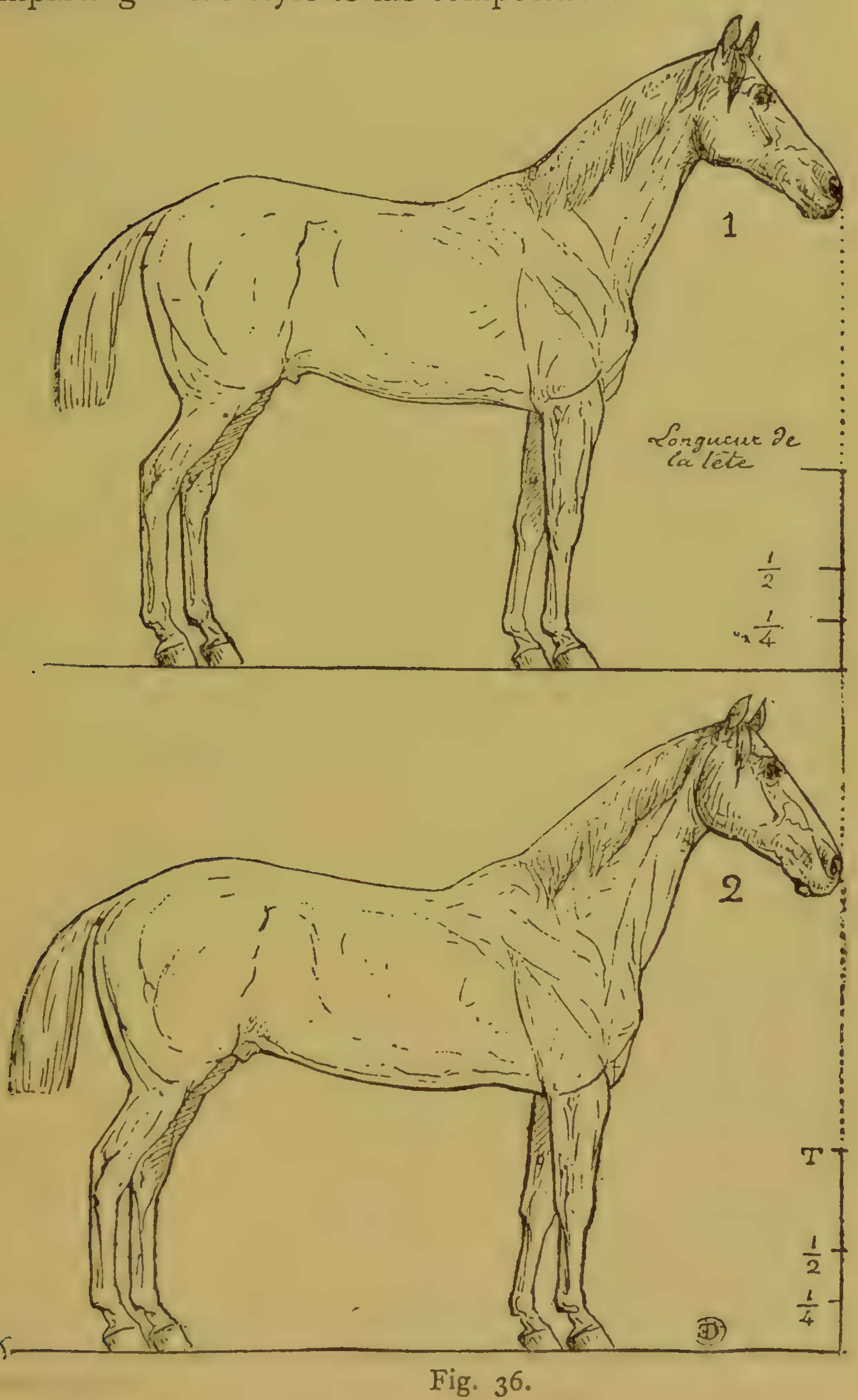


Fig. 36.

The English breeder, by means of clever combinations,

has certainly produced a horse which is longer than will ever be the descendants of its Arab ancestor, fortunate when it is indebted to the inclination of the shoulder and the size of the thigh, and not to the flanks, which will then be under defective and weak loins.

Never let it be forgotten that, above all else, I would warn the artist against the tendency of representing the conformations of horses after the manner of the English engravings, the thorax and haunches of the animals of which have dimensions double those of reality; the admission of these elegantly-reproduced and beautifully-engraved exaggerations has become almost a tacit convention, although they possess no resemblance to nature, and have their sole justification in the habitual erroneousness of vision.

The figure of the horses of the present day is the same as that of the famous steeds of antiquity; their internal conformation and their muscularity can have undergone no variation. As for the gaits, the walk, trot and natural gallop bear complete resemblance to the same gaits of horses broken by habit without the assistance of the riding-school, because it has always been mechanically impossible, outside the small class of clever circus horses, to induce the four members to move in any method contrary to the natural order.

The osseous frame of the animal changes neither its correspondence nor its proportions, in order to respond to the artificial education given to the individual; it can be taught to dance, but it instinctively knows how to walk and run.

In Europe, the work to which horses are submitted being more interrupted by repose, consisting as it often does in the case of the same animal now of carrying, now of drawing, with more or less speed, it has proved necessary to increase the stature and develop certain proportions, at first by substantial nutrition as reparation for and facilitation of considerable efforts, subsequently by judicious modification of this alimentation, according to the nature of the animal and the exigencies of the muscular resistance demanded by the special work required.

The English have wisely allotted various breeds of horses to the different employments demanded. Select as

a type the English saddle-horse, which is of Arabian origin, and submit it to comparison with its ancestor: it has both grown and elongated, whilst remaining solid and spirited, but speed is the predominant quality, whilst sustained effort is invariably the dominant feature of an Arab; in one word, the duration resulting from concentration of strength.

It is necessary to see if the English horse has quite answered to all the expectations formed of his shape and pluck by examination of the object aimed at. This important matter needs elaborating with far more knowledge, and at much greater length, than I can devote to it. Whilst leaving its decision to specialists and to those who have made a conscientious study of the horse, I can nevertheless assert, basing my assertion upon evidence only too thoroughly attested, that the race-horse, such as we know it to be at the present day, could not with credit to itself undergo the *lengthy* trials to which it would have been submitted in ancient times. It possesses speed without progress, and this is at all events a considerable compensation for the sacrifice of capability and of form. The English themselves agree as to this.

The form of the horse has been sacrificed in the increase of its size and in the destruction of the harmony of its structure; it has been made more slim and lighter in the elongation, but also more delicate and less solid. I do not think that this meagre, and, so to say, hump-backed horse should be given as the type for representation, bringing in its train, as it does, all the blemishes of a premature old age, resulting from excessive and precocious labour.

What future prospect is there for a colt which has, at the age of two years, been already trained and raced? It is impossible, when thus acting, to have at heart the aim of the amelioration of the equine race of the future.

M. Delamarre discussed this matter, a few years ago, and laid considerable stress upon it, prescribing in a very absolute manner the employment of the race-horse as being destined to become in future reproductive in France, and the regenerator of the indigenous breeds; a really useful stallion would only bequeath the defects to

its descendants, the defects inherent in its own slim and desultory conformation.

Baucher believes the race-horse to be specially bred for the purpose of satisfying the public curiosity, with the solitary good quality of being able to cover a league in from four to six minutes, and as early as 1833 he registered a vow never to permit horses to gallop, the physical construction of which would incapacitate them from rendering useful town work a few days after a race. "It would be highly advantageous," he would say, "to replace these gallopers, incapable of any useful work, by saddle or carriage horses, light and well-proportioned in the formation; the ones being harnessed and the others being ridden would develop all the extension of which they were capable, at a trotting gait."

The horses of warm lands are courageous, lively, restless and violent, capable of enduring the greatest fatigue, and usually prove long-lived. Their development is slower than that of the northern horses; but if the horses of the northern lands are larger and breed with greater promptitude, they are also indolent, cold, timid, restive, unintelligent, incapable of prolonged exercise, and worn out at an early age.

Saddle-horses and hunters can no more be light without being thin than can the race-horse, the rays of which can be elongated and the dryness of the muscles, capable of violent efforts, indicated.

The draught-horse should be vigorously built, with big members, To be handsome it should be the impersonation of strength without heaviness or puffiness.

I have endeavoured to enumerate the proportions which establish the most harmonious correspondence, frequently found in horses; with their aid, the artist can construct a type appropriate to the model he desires to reproduce.

I have already observed that the best situation in which to place a horse, for the purpose of measurement, is to pose it in such a manner that the direction of the head be evidently parallel to the shoulder, a pose which the animal assumes in numerous photographs.

It will then be ascertained that the upper portion of the nostril touches the prolongation of the horizontal of

the withers. This fact is rendered apparent to the observer, in all carriages, by the *bridle* (passing in the key of the mantelet and that of the collar of the superior portion of these two rings) ; this stretches exactly to the height of the withers in order to fasten itself to the bit,[1] and thus physically underlines the horizontality of which I have been speaking, a horizontality equally produced in the saddle-horse, from the withers to the nostrils, when the rider, keeping his hand low, lightly holds the reins of the fillet.

[1] With all quiet horses, the bridle is attached to the banquet, the ring of which is at the height of the canon of the bit.

CHAPTER VII.

PERPENDICULAR.

The polygon, the lines of which exteriorly circumvent the four feet of the animal in a fictitious manner, constitutes its normal station or *base of support.*

Viewed in profile, the large side of this base is three-quarters of the length of the horse, from the anterior toe to the posterior toe, a measurement which is again found in the interspace of the trails of the trot.

The *small anterior side* of this geometrical figure is about equivalent to a quarter of the whole length of the animal. The side which bounds the external traces of the hind feet is a little smaller. It is unusual for this latter to possess three times the diameter of the hoof, a measurement often found in repose as the separation of the anterior feet upon the ground in the cases of saddle and harness horses, the trail of the shoe of which varies from 12 to 14 centimeters in diameter.

Because of the force of its chest, the draught horse frequently possesses a more separated anterior base, its foot even covering as much as 16 centimeters in diameter. In support of what I have just observed I would cite a recent verification made at the military school upon the most vigorous horses of a regiment of cuirassiers.

I have counterdrawn the largest shoes at the forge, without finding any above 16 centimeters, and the farrier having brought me the horse which he considered the most robust in the regiment, it was found to have 71 centimeters head measurement, 42 centimeters width of chest, and 16 centimeters of the forefoot.

That same day I found in a wagon horse having 66 centimeters head measurement, with a breadth of chest of 46 centimeters, a smaller diameter of the anterior shoe than that of the charger to which I have just alluded. In

the case of the latter, the anterior side of the base would be thrice 16 centimeters, namely, 48 centimeters, on the supposition that the feet only left an intervening space equivalent to their size.

It may, therefore, be admitted that in many cases they will be less when 42 centimeters are accepted as the size of a fine chest.

It has been previously observed that there is difficulty in the assignment of a well-defined position for the centre of gravity (see O, fig. 1). Its situation by approximation, is at the passage of the girths, towards the eighth rib, upon the vertical touching the extremity of the cartilage forming the inferior appendix of the sternum, and at the junction of the horizontal which passes above the stifle (rotula). The anterior members thus support a heavier burden than the posterior.

To *place* and judge the perpendicular, the horse must be brought to approach the angles of a rectilineal figure of such a kind that each member of the lateral bipedal, in the middle of its *appui*, supports a weight approximately equivalent to an equal proportion of the whole.

If it be also difficult to lay down fixed rules for the equilibrium, there are, however, certain data which permit a sufficient estimation. The horse at rest, with the foot set flat upon level ground, having the weight equally balanced upon the whole circumference of its hoofs, should have vertical canons.

Certain lines have been imagined which, being perpendicular to the ground, may assist the certitude of the good direction of the members, in order that the progressionary movements may be made as far as possible upon a plane parallel to that of the axis of the body.

The horse being in profile (fig. 37), the vertical (*c*) of the point of the arm should encounter the earth perceptibly in advance of the toe of the forefoot (*a*). For the direction of the anterior member to be regular, it is necessary that the perpendicular to the ground, dividing the fetlock in the middle, should also split the canon and knee in a similar manner, whilst pausing at the height of the base of the sternum towards the posterior third of the forearm.

If the vertical of the point of the arm touch the foot,

the horse is said to be *camped* (*c*, fig. 37); thence results great fatigue of the articulations and an abatement of the gait. If, on the contrary, the intersection of this line with the ground leaves the toe considerably behind, the horse is *under itself* (*b*, fig. 37), and is predisposed to be unsubstantial in its fore-part, a considerable drawback for a saddle horse, but none whatever for a draught horse.

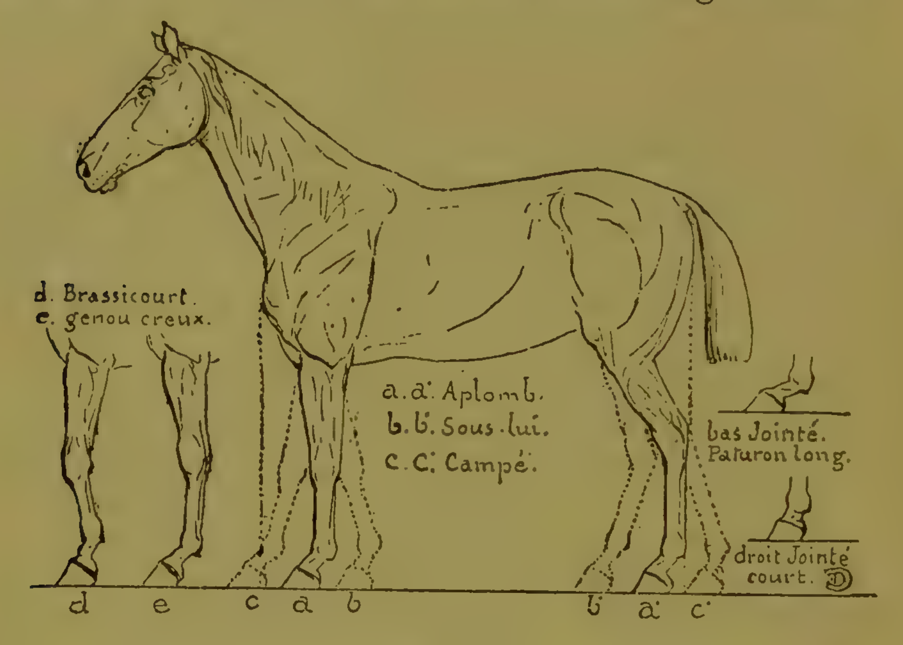


Fig. 37.

The inclination of the members has been intentionally exaggerated in the drawing (fig. 37).

If the vertical of the forearm, which should divide the knee into two equal portions, passes near the uniciform bone, that is to say, if it leaves the knee in front, the animal is *bowlegged* or *crooklegged* (*d*, fig. 37). The former is a natural defect, the latter from wear and tear. When this same vertical touches the heel, the horse is *straight-jointed*, and *short-jointed* (fig. 37) if the pastern be short; the reactions are hard. It is *low-jointed* when the prolongated line of the pastern makes a very acute angle with the ground, and the fetlock, approaching the earth, appears to push the foot forward. In this case the animal is usually *long-jointed*, which signifies that the pastern is long and the reactions gentle, yet that the tendons are much fatigued.

When the knee is too much to the rear or too near the

vertical, and so to say driven inwards, it is termed *hollow-kneed*, effaced (*e*, fig. 37).

The posterior member, *seen in profile*, should touch with the point of the hock, the vertical tangent of the point of the buttock. This continues to elongate the tendon to the fetlock.

If the direction of the canon, with reference to this line, be oblique in front, the horse is *under itself* (*b*, B′); if the obliquity makes itself visible in the rear, it is *camped* (*c*, C′).

When the horse is full front the vertical which touches the *point of the shoulder*, on arriving at the toe, should divide the foot into two equal portions, likewise the fetlock, pastern and knee. If this straight line leave the knee within, the animal is *closed in front* (fig. 38), and the feet are near together, the equilibrium is unstable; this facilitates quick gaits of brief duration.

If the knees exceed the vertical, the horse is too *open in front* (fig. 38). This arrangement is favourable for a draught horse with a solid base and a tufted chest.

When, from the knee alone, the canons and feet turn outwards it is called *crook-legged* (fig. 39); if inwards *parrot-toed* (fig. 39), because the toes are near one another.

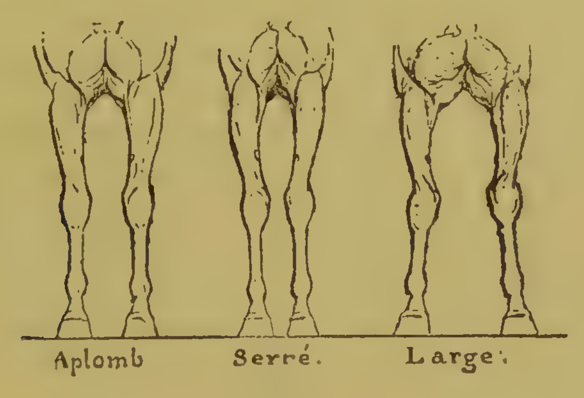


Fig. 38.

The *bow-legged* horse (fig. 39) is one the fore members of which deviate from the vertical by bending with the knee outside the line which divides the foot in two; if the knees make the opposite curve, it is ox-kneed.

When the posterior limbs are *seen from behind*, the

perpendicular to the ground should divide the hoof into two portions ; also the canon and calcaneum and touch the point of the buttocks.

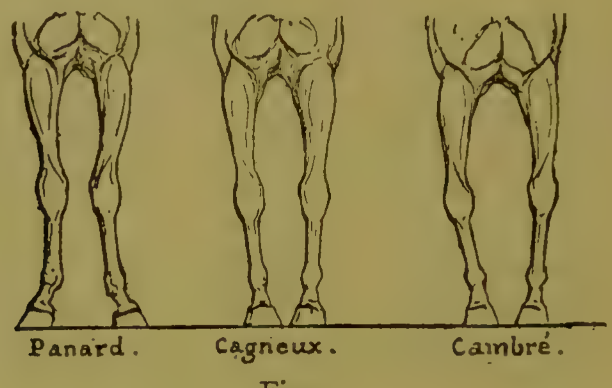


Fig. 39.

At the commencement of this chapter, it was remarked that the space between the hind feet was generally less than that which separates the fore feet, when the animal is *naturally* in repose (Fig. A). The verification which can be made upon the skeleton fully demonstrates this.

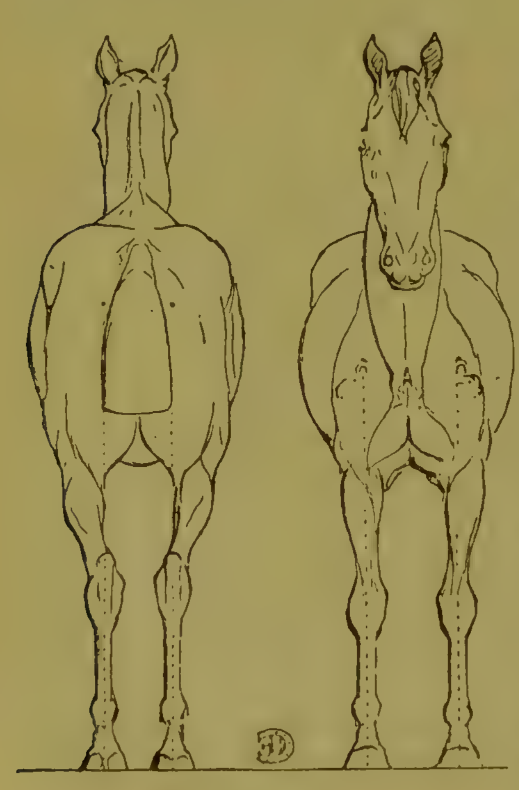


Fig. A.

For the purpose of determining statistics, I am making use of an animal of Mecklenburg in the anatomical gallery of the Museum. It was, in all probability, a strong horse, since its head is 65 centimeters ; the *size of its pelvis* (size of the croup), from one anterior angle of the ilium to the other, measures fifty-five centimeters. The ischial tuberosities (points of the buttocks) are only twenty centimeters apart from one another, which, upon the ground, constitutes the separation of two lines, which all the

authors mention as those of regular posterior perpendiculars.

In the case of the horse under consideration, and to which must be assigned a foot of at least fourteen centimeters, this vertical dividing the two heels through the middle would only leave six centimeters of distance between the interior walls of the two heels.

I have measured, for the example just given, the strongest horse of the series, having one meter sixty centimeters in height.

A much smaller animal, having only one meter, forty centimeters in height, had, for a size of croup measuring forty-eight centimeters, the same measurement of twenty centimeters between the ischial tuberosities; on the supposition, for this latter, of a pedal diameter of twelve centimeters, because of the diminutiveness of its height there would then be only eight centimeters of space between the shoes for the vertical of the perpendicular to divide in half.

The posterior members offer the same particularities as the anterior with regard to this vertical.

Inwards the horse has its limbs *too closed*. The hocks are *close* and the animal is *crooked* (Fig. 40) if the hocks form the summits of a re-entering angle tending to be *knock-kneed* (often this defect, which does not in the least impair speed, is found in the horse, and especially in the Arab mare). The general direction of

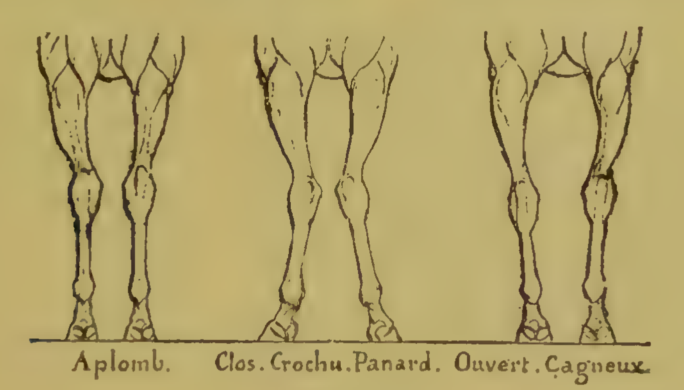


Fig. 40.

the member being very much outwards, the animal is *too open* (Fig. 40), which renders it heavy; with reference to the hind limbs, the animal is also said to

have the hocks too open, *to be close, crooked, crook-legged, and knock-kneed.*

I ought to draw attention to the fact that the angle of inclination of the pasterns with the ground is less acute in the case of the hind foot than in that of the fore foot, and the slope of the wall less inclined ; in a word, the horse is more upright in the posterior than the anterior. I have verified this disposition in the East upon adult horses unblemished by shoeing.

The *station* is the position during which the weight of the horse is supported upon the four limbs, or only three. It is *free* or *forced.*

In the first case it is repose, with three limbs resting on the soil ; the fourth member, which is always a *hind-leg,* is bent and is placed upon the ground on the point of the toe, which is very close to and sometimes even touches the neighbouring foot at the *appui* ; this latter constitutes the summit of a triangular base, of which the two fore-limbs form the small side.

It is this repose alternatively provided by the posterior members which enables the animal to remain on its feet for a very considerable time, without having recourse to the *lying down* or *decubitus* for the recuperation from fatigue.

In the *forced* station there is no flexion of the members, and each proportionally contributes to the support of the weight of the body ; the equilibrium is the firmest and the muscles undergo contraction, yet with less fatigue than when the animal is *camped* with the members more remote from the centre of gravity, an uncomely and stiff posture which coachmen frequently cause their horses to assume when pulled up, although everything militates against this fashion, which provides an elongated base injurious alike to the station and to the resumption of the motion.

The opposite to this last is *the gathered up,* which draws the extremities of the centre of gravity nearer by bringing them under the horse. Thus *placed* the horse only desires to obey the rider ; it is in a position of *poised* fatigue, which is attained by starting with the *bringing back* of the head to the vertical position.

All this is artificial, and is obtained by breaking in.

The artist will frequently have to represent tranquil postures; they vary much with regard to the distance of the *hind-legs* from one another, but it is especially to the fore and to the rear that these posterior limbs have a tendency, departing but slightly from the medial plane.

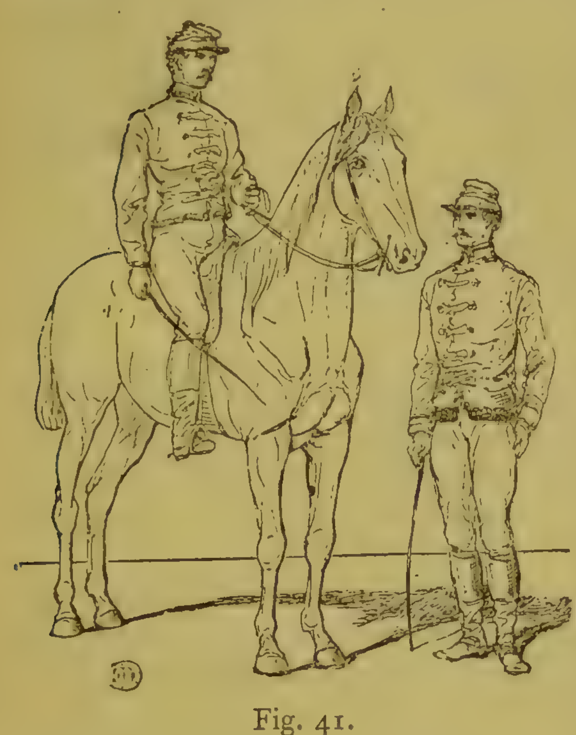


Fig. 41.

The anterior members only sensibly exceed the line of the perpendicular in the fore owing to extreme fatigue and when ill; in the inclined position the member is said, in vulgar parlance, to *stand like a dancing master*, *to point*, or *to fence*.

Figure 41 represents a horse in a natural station. The relative proportions of the men and the animal are rigorously observed. The horsemen have the stature of cuirassiers.

POSITION OF A MAN ON HORSEBACK.

I invariably advise the horseman (as M. Raabe also teaches in that tone which is so justly authoritative when it has reference to hippic science) to have the *upper part of the body* easy, free and *straight*, in order to preserve his perpendicularity with pliability, and not to lean to the rear, which tends to carry the legs forward, depriving them of their stability, instead of permitting them to fall naturally, close to the sides and behind the girths, the only position which permits the skilful manipulation of the horse in every direction. The body of the rider must therefore be straight, without awkwardness or stiffness, well-seated, *i.e.*, his weight symmetrically

distributed in the middle of the saddle. He will hug the animal by allowing his thighs to fall on either side, without confining himself to turn them inwards in order to bring the feet to a parallelism as uncomfortable as useless, since to be naturally placed these should be turned slightly outwards. (See fig. B.)

In equitation, the word *seat* is understood to express the manner in which the man is posed in the saddle : otherwise expressed, it is the solid and immoveable *appui* on which the mass of the body of the rider is fixed in good equilibrium.

The persistency of the good seat of an equestrian depends on the perfect adherence of the thighs as far as and inclusive of the knees ; it is through the palpably perceptible contact of these last that the immobility of the femoral ray is maintained, which is so important in equitation.

The fold of the knee shall be pliant to permit the manœuvring to the rear of the legs so that they may enclose the horse, under its greatest diameter, spurring it in useful places.

On a horse, seen in profile, the point of the foot of a well-posed rider will never exceed the vertical touching his knee ; the boot, of which the anterior third must alone be in the stirrup, should have this portion more elevated than the heel, for the preservation of the *appui* by a single pressure without exertion.

On all occasions the rider must be able to hold himself erect upon stirrups he thus occupies, without discommoding his legs, and also, at need, must be able to make use of an arm for attack, fight, or self-defence.

The stirrup becomes completely filled up to the instep when leaping obstacles or racing.

It is by means of his legs that the rider connects himself with all the motions exacted by his will, and they therefore form the principal *agents* for the domination of the animal ; by inspiring fear of the spur, they produce obedience and submissiveness. These few observations are made because it is of importance that the artist should subordinate the actions of the horse to the position of these aids to the rider.

The *aids* serve to put the horse in motion, guide it,

and cause it to pull up; the leg and hand are the two principal. The best action is that resulting from their good accord for the domination and foresight in the constant struggle which takes place between the animal and the man. The pressure of the leg invariably precedes that of the hand when the two act together.

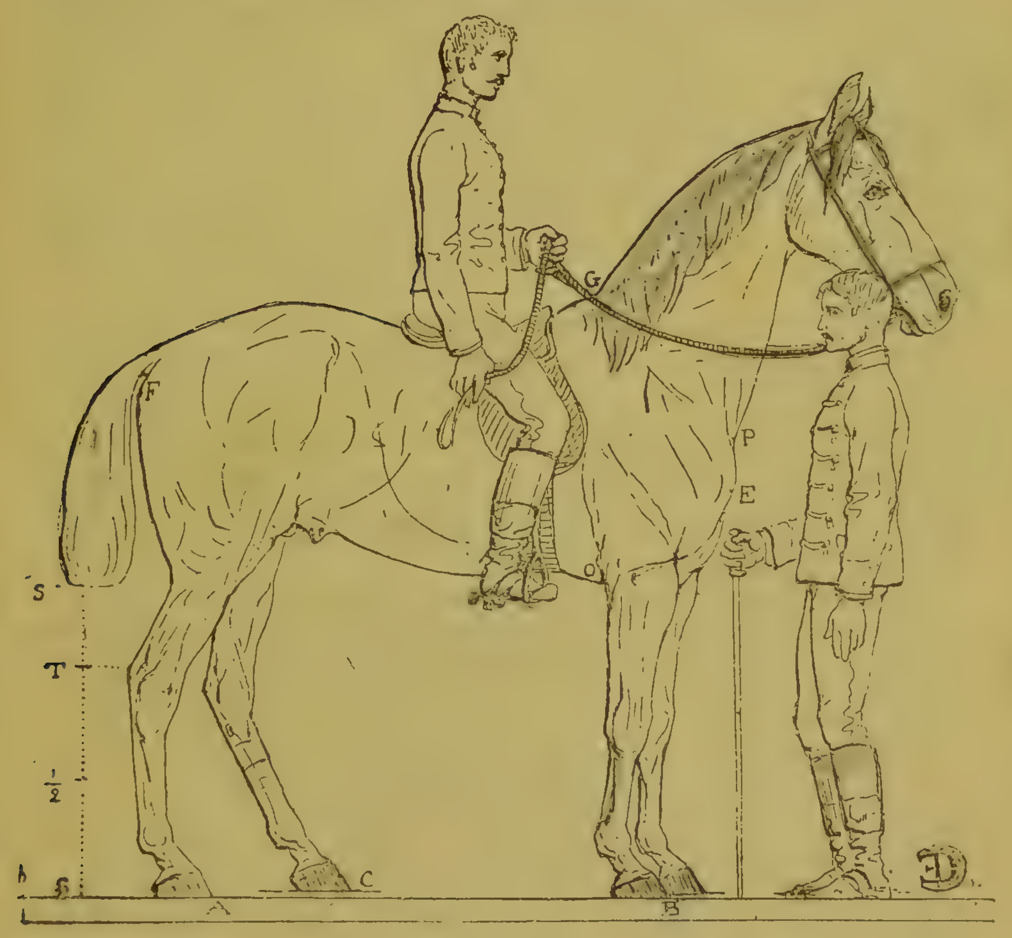


Fig. B.

The rider will make use of his legs: (1) Near the girths, to gather the horse together, to maintain it immoveable, to slacken its speed, and to cause it to back.

(2.) A little in the rear of the girths, to cause cessation of backing, to support the animal, and to assist it to turn to right or left.

(3.) Far to the rear of the girths, for the determination of the forward motion and the displacement of the posterior members.

Just as the legs of the rider must progressively press closer during the action, so must they relax little by little (but without the withdrawal or ascension of the knee), thus reverting to a natural fall upon the stirrup again become vertical,

I have no intention of further entering upon equitation, being neither authorised by my own competency nor by the aim of this work. Those desirous of practical cognisance of the horse will find complete satisfaction in the instructive book ("A Reasonable Theory of Riding") by M. Raabe, the professor of equitation, which is a necessity for every horseman; it is by his authority that I have been guided.

Despite the difficulty of composing a type recapitulating all detailed in the previous pages, after measuring many equestrian photographs, as well as a considerable number of horses, I have been able to arrange a group representing a rider and a man on foot, which nearly correspond to the measurements most frequently repeated in this book.

The drawing (Fig. B) establishes relations which, I trust, will be used by artists in their compositions; I can guarantee that they are the nearest possible approach to Nature.

The man on foot who serves as example is 1 meter 70 centimeters in height; he is exactly twice the distance from the sternum of the horse (O) to the ground. He is the same stature as the man, previously shown, who is placed in the saddle in the regular position of a rider.

The horse is 1 meter 60 centimeters in height from the withers (G) to the ground. The head is 60 centimeters. Take, with a pair of compasses, the distance (S, T), which is the length of the head, from the end of the nose to the nape of the neck, between the ears, and, subsequently, the half of this length. Apply these everywhere where I point out these limitations, and the verification of all the measurements in the article on *proportions* (Chapter VI.) will be found.

To complete the references, I would add that the length (S, S′), which equals the vertical from the ground

to the sternum (O), is found from the point of the hock (T) to the superior portion of the origin of the trunk of the tail ; from the withers (G) to the nape of the neck when the head is placed parallel to the shoulder and the horizontal of the withers passing to the superior portion of the nostrils ; very often from the elbow to the stifle ; it is also the length (S, S′), especially for horses as high as they are long.

In the rider (S, S′) measures from his seat, in the middle of the saddle, to the top of his head (vertex). The length of the head is usually comprised between the neck of the man and the saddle.

The horse in figure B is *placed.* On the right it rests upon the broad side of its base of support, *i.e.*, the distance (A, B) of the right lateral base equals three-quarters of its length (E, F) from the point of the arm to the extremity of the buttock.

I have advanced the left hind-leg (C) so that it rests in rear of the right anterior member (B), thus forming the right diagonal base at a distance equivalent to the length of a half-pace. This measurement of about 85 centimeters is here almost the same as (S, S′) ; it, however, varies in a long horse.

The length of the horse (E, F) equals its height from the withers (B) to the ground.

The man on foot vertically holds a stick of 1 meter in length, which may be considered as the perpendicular of the point of the arm to the ground.

In conclusion, I will point out a last measurement, that of the outstretched arms of the two men from the extremity of the extended hand to the chin ; this is half the height of the one on foot. We here again find the length (S, S′) which has served as the scale for the composition of the group. Usually the height of the human head but slightly exceeds 22 centimeters.

The vertical of the sternum (O), or its equivalent, (S, S′), contains the head of the horse, *plus* about a third of this length—a measure which I recommend as the espacement of the diagonal *half-pace* from one toe to the other, a distance far nearer the 85 centimeters of the calm gait of the walk than the 90 exclusively pertaining to the large horses.

The example presented is a summary, or combination, in which is united, under a single view, the measurement of details taken upon living models.

It appeared to me beneficial to familiarise the reader with these measurements, representing the most acceptable data, by working upon a horse of 1 meter 60 centimeters, bearing a rider of 1 meter 70 centimeters.

These dimensions will answer the average of exigencies in equestrian productions.

I must, however, add, that I feel great pity for a painter who only uses his palette to subordinate it to a *yard measure.* His artistic independence will never survive it. In order to leave him but the fruit of the arid labour, to which I have devoted myself, I only give him the result in virtue of disinterested advice. This little work, which may be almost considered geometrical, has no other aim.

Myological Study of a Horse,

With the Principal Muscles of the Superficial Layer upon which the Skin is Stretched.

This figure may be regarded as the summary of the details contained in Chapter IV., entitled "The Exterior." In addition, it presents the heads of bones which make a visible prominence under the skin. For the purpose of making this drawing, a vigorous animal was utilized.

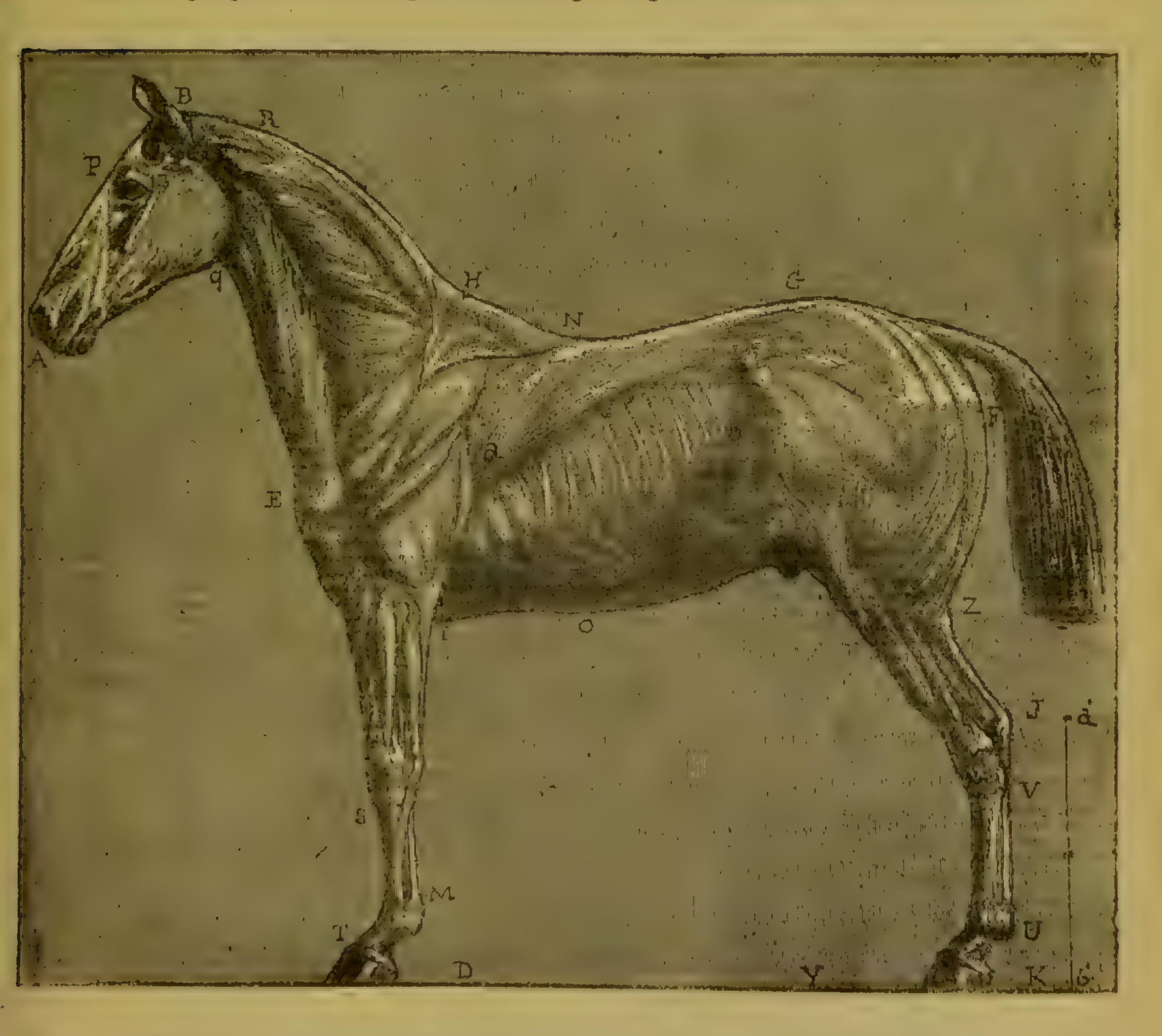


Figure of a Horse without Skin for the Study of the Muscles.

The length of the head A, B, is again found from the point H to the point E, from N to O, from I to M, from *a* to *b*, from J to K; and the half head from P to *q*, from *q* to R, from T to S, from U to V. This horse has the same height to the croup G, Y as to the withers, H, D. It is as high as it is long, *i.e.* H, D equals E, F.

CHAPTER VIII.

THE COAT.

The colour of the hair of the horse is denoted by the word *coat*, which is synonymous with *robe*. Without forming the characteristic of a breed, a hue may nevertheless be more frequently found in one country than another. Preference will be accorded to tints frankly indicated rather than to those of horses with washed hair, with indecisive tones, whitish, or marked with several colours.

The term *simple coat* is applied to hair of uniform colour, and that of *composite coat* where several hues are mingled.

White, black and sorrel are the simple coats.

White, either silver, or ordinary, or pale. The employment and description of horses of this coloured hair goes back to the reproductions and accounts of the most ancient times.

The absolutely *white* horse, without any mixture of colour, does not exist. It is light gray, but may appear to be really white, especially at an advanced period of life.

It is much found in the East, and this hair has more persistency in reproduction than the others. *Silvery* white has brilliant and nacreous reflections ; the *pale* is lacteous and dull.

Brilliant, or jet *black*; the ugly black, which is rusty and reddish, and the dull black.

The *sorrel*. The horse termed *sorrel* has reddish hairs, even at the extremities and the mane. Among its varieties are the *light sorrel*, *golden sorrel*, *cherry sorrel*, *copper-coloured sorrel*, *chetsnut sorrel*, *burnt sorrel*, *and dark sorrel*.

The second category contains the composite coats. These are the *bay*, the *Isabella*, and the *mouse colour*.

The *bay*, of which the hairs are red, the extremities, mane, and tail black. Its varieties are the *light bay*, *cherry bay*, *golden bay*, *chestnut bay*, *maroon bay*, *vine-hued bay*, *brown bay*. This latter is almost black with flame-hued colorations on the head, flanks and buttocks.

The *Isabella* is lighter than the sorrel because of the predomination of white. Sometimes zebra stripes are found on the extremities; also the mule-ray, In the case of the mouse-coloured hair, the same peculiarities are discernible as in the preceding, but it is the black and not the white which is the predominant tint.

The *gray* coat is the most common. It is composed of the combination of black and white hairs. The light gray where the white dominates, the reddish roan gray are distinguished. The *dappled* gray, black and white patches intermingled, the *slate* gray with black skin, the *trout-coloured* gray with reddish patches, the reddish *clayey* gray with black patches, the *iron* gray with more of a deeper-hued mixture, the *flea-bitten* gray, a gray ground with white patches.

Other mixed coats are the *flea-bitten*, composed of red and white hairs and mane of the same. Peach-hued, large red patches upon a white ground.

The *roan* is composed of black, red, or white; according to the predominating colour it is called deep or light roan. Finally, the *pied* coat, the black bay or sorrel, patches of which glare upon the white.

The *black* pied has black extremities, the white pied has white. The pied coat was highly esteemed in the last century. Artists frequently used it for the mounts of cavaliers of distinction, of generals and for the teams of State coaches.

For the completion of the specification of the horse it is necessary to add the description of the particularities and the signs. They are the markings upon the ground of the coat, and are especially found upon the head, buttocks and limbs.

I will recapitulate, merely enunciating, the particularities, which are: *Dappled*, *marbled*, *dapple-bayed*, *trout-coloured*, *spotted*, *marked with black spots*, *speckled*, *washed*, *zebra-striped*, *rubicon-coloured*, *jet-black*, *flame-*

hued, *whole-coloured leprous*, this last expression indicating a portion of white or rose flesh, bare of hair, frequently to be found round the mouth, eyes, anus and vulva. I would point out that on the elevated plateaus of Africa I have met with albino horses among whom the leprosy is an actual infirmity, for, owing to it, they have large patches undefended from heat or the wind, and are unable to endure either bit or bridle.

Among the most important *markings* may be noted : *the star*, *list*, *mule-ray*, *fox-nose*, *moustaches*, *épis*, and the *white-feet*. This last is white upon deep coats, and is found upon the limbs, usually commencing at the start of the coronet. It receives different names, according as it mounts high upon the canon, from the simple *trace* to the *very high white stocking*, going from the pastern to the ham.

In conclusion, let us cite the *épis*, formed by a tuft of hair which turns up. It is held in very high estimation among the Orientals.

The knowledge of the coats of the horse needs development. Nevertheless, we would lay stress upon its importance, for it is the first index available for the recognition of a horse, by affording the *indication* for establishing its identity.

The seasons and attentions in the stable, can, however, modify the coat. To be complete, it is therefore incorrect to be content in its indication with *simply* following the designation of the sex, age, or height of the animal. It is necessary to further add, the particulars and the appreciations which are the consequence of the detailed examination of the forms and aptitudes of the subject. It will then be a *composite indication*, the only one of real value.

CHAPTER IX.

APPENDIX.

Those who write with thorough knowledge upon ancient art are few. The very thoughtful and serious work of Winkelmann is a document of the highest value for reference about the Greeks. He says that among them the study of the nature of animals was no less the aim of their artists than of their philosophers.

In spite of having approached those ancient works with a mind predisposed in their favour, it has been impossible for me to be convinced as to the form characterising those animals which they have generally desired to make other than accessories, so entirely have they neglected what Pliny calls *parengon*, that is to say, a mediocre object to enhance the value of the principal subject.

M. Lens, in his work upon the costume and garments, frankly complains of the defects of certain ancient productions arising from the ignorance of their authors about everything outside human nature. Winkelmann throws all the blame upon the bad translation of the engravers, and appeals to the real monuments.

I have visited, in Italy, the works cited, and despite the affirmation, according to Pliny, that Calamis very adequately represented horses, the fact appears to me disputable, because the author displays the same admiration for the lion of the Pyreus of Athens decorating the entry of the Arsenal at Venice. He ranks it among the handsomest monuments of this class, whilst admitting the ideal side of these antique figures, which distinguishes them from living lions. I have just seen this monument at Venice, and can affirm that this heraldic lion can only be classified as mythological.

Winkelmann had already met with contradiction, so far as the reproduction of horses was concerned, from the Abbé Dubois, who opposed to the small horse of Greece and Italy of that epoch, the horse of large outline, of which England offered him the model.

What appears barely pardonable to the ancients in this respect, is the large number of equestrian statues which they elevated, perhaps a thousand, as against one of our epoch, according to the report of their authors, for art was employed from the earliest times in the immortalization of the recollection of individuals. Every Greek could aspire to such an honour.

Anciently at Athens this distinction was at first accorded to conquerors in corporal exercises. Plato did not disdain to figure among the number of athletes in the Isthmian games of Corinth, Delphi, Pythagoras in Elidia, etc.

The statues are generally equestrian, and tradition, whilst affirming their resemblance to the victors, mentions that the horse was also a portrait. It is Ellien who acquaints us with it in speaking of the horses of the celebrated Athenian Cimon. Had Calamis comprehended as thoroughly as Virgil and Horace all the qualities and beauties of the horse? I doubt it. In these hippic productions I am not referring to the heads which are perfect.

The bas-reliefs of the Parthenon are justly vaunted. The small stature of the horses cannot be assailed, it being a convention to greatly reduce them by subordinating them to the height of man. It was also necessary to have regard to the place reserved by the architect.

I must now crave permission to quote the opinion of some contemporary artists about artistic representation.

Eugene Delacroix, who incessantly recommended exactitude of drawing, wrote in the *Revue des Deux Mondes,* in 1850:—

"To draw is not to reproduce an object as it is, that is the business of the sculptor, but such as it appears to the draughtsman and painter; this latter achieves by means of the gradation of tints what the other com-

menced by the due disposition of lines; in a word, it is necessary to put perspective into the eye, and not into the mind, of the student. With the exact proportions of your perspective A + B, only truths are taught, and in Art all is a lie; what is long should appear short, what is bent should appear straight, and *vice versa*."

He here allowed a little too much latitude to the *beautiful*, which is impossible to describe, but, nevertheless, it may be fundamentally stated that style borrows its power for effect from the accent of the veracity of form, attitude and physiognomy.

How many painters are content, when aspiring to an elevated style, with portraying *verities* and *too conventional nudities*, especially in the representations of animals. This impresses our imagination and regulates our judgment in Art; we subsequently reason upon what has previously aroused our emotions. It is necessary to make this examination indulgently and without scrupulous analysis of mathematical details, for it is certain that one of the pleasures transmitted to our sensibility by the eyes is derived from convention. *Truth embellishes*, that is to say, elevates to the power which it is rarely permissible to an artist to attain. This does not exclude the axiom which declares truth to be the source of beauty in Art, and the means of causing the smallest estrangement.

The Greeks astonish us by the beauty of their works with reference to the human type; their greatest merit is that they are comprehensible, because they work simply, usually proscribing violent actions. Their statues, scrupulously modelled, have only the vitality, which perfectly corresponds to the attitude sought before reproduction, and in all the search the dominant idea was that of elegance and power.

M. de Clarac was quite correct in declaring that the ancients only presented to us, in their works, a nature selected and offered in its highest nobility of form; they made a type of beauty by slightly modifying the living model, which rarely reaches perfection.

To attain this object, the Greeks, born under a happy sky, had before their eyes the most beautiful forms nature could produce; the freedom of their institutions,

their manner of living, their gymnastics and their games continually presented them in action, and frequently without any concealing garment.

Statuary could, at each instant, select the most beautiful models, and reproduce them in their entirety and their details ; its life was a perpetual study, and all frequented places and congregations for amusement became its studio, and even rendered it further service ; nature, in all its variety, incessantly displaying itself in action, and developing, without constraint, all the means and forms.

If what we have just recalled be compared to the *posing* models of actual studios, the difficulties of sculptors of our day may be estimated.

How can the negligence of ancient artists for the form of horses, as disclosed by their historic pages, be explained ? Enormous bodies with rounded outlines, small heads, eyes close together and looking straight before them, limbs in no way resembling those which should support an animal having the rotundity of a barrel, the articulation of the withers being invariaby composed in profile of two heads of bone, super-imposed like a human knee.

In this respect the sculptors had not more regard than the painters for an outline, which the spectators could recognise as false, by immediately verifying it upon the first living animal that presented itself.

This idea of a conventionally adopted form is so ingrained, even among men of the highest talent, that the sight of the contrary does not suffice to correct them ; this appeared to me especially evident in a gallery at Florence, in an original drawing by Albert Durer, purporting to be the exact representation of a horse, as was proved by a rough sketch, covered with notes, indicating the presence of a living model ; the drawing upon which these measurements were applied, when compared with those afforded by nature, are very inexact, especially as to the limbs. There can be no doubt that Albert Durer had not the animal under his eye when he thus limited the outlines by figures for the purpose of specializing the existence of each muscle.

It is evident that in subjecting himself to this labour

the artist had only need, for its proper accomplishment, to rely upon his eyes for the rectification of a false outline, which existed only in his imagination.

Camper appears long ago to have resolved this question, by declaring that the beautiful, which is supposed to exist in the human and other animal structures, solely depends upon a mutual congruity established upon the authority of a few individuals.

The aptitude to seize upon and appreciate the beautiful, which is usually called sentiment or taste, derives a certain modification of the spirit, which can only be attributed, as a general rule, to education and the habit of contemplating the best artistic productions; and it is, in fact, by reason of the knowledge which we have acquired by study and instruction. Here, Camper relies upon Winkelmann, who confirms his appreciation in this respect by writing:—

"An honest and well-considered education causes the birth of the sentiment of the beautiful and imparts premature scope to it."

Topfer, the refined Art critic of Geneva, calls drawing "the imitation of the form," but he denies that its strict copy is the end and constitutes the principal merit of drawing, this becoming only an integral portion of Art so far as it proceeds in some degree from the thought of the artist, and not so far as it is the materially exact copy, mechanically accurate, of natural objects, as it is understood by geometry, which traces the forms in their absolute accuracy, instead of which the artist should only seize upon the relative proportions, the general character of the object, the translation by the thought of what the eye perceives, which is tantamount to saying that *Art only embellishes the nature that is imitated, so far as the artist perfectly possesses in himself all the knowledge essential for the rectification and beautiful rendering in his copy of what is defective in the model.*

This was often written by specialists in the last century. It is true that from the point of view of the form of the horse the instruction was absolutely erroneous; this was probably the cause of the negligence of the old masters who, whilst giving to the animal represented in a picture the importance of a blot, only

regarded it as a very slightly studied accessory; nevertheless, in those olden times are to be found the reproduction of certain gaits, as I should like them to be made now, when the former are more studied; it is upon this that I wish at present to insist.

Winkelmann, who we have already cited about Greek art, book IV., chap. IV., was as hesitating as the others. He erred in speaking of the Venetian horses; they perfectly indicated the diagonal *appui*, although the elevated foot is a little too much in advance of that which follows it diagonally.

Since we are considering ancient sculpture we will quote the criticism of M. Cherbuliez, who, in his interesting essay "About a Horse," makes an able summary of his advice, and passes ancient sculpture in review. He first shows the realism of the Ægean School, with the minutest exactitude of the reproduction of the form and proportions of the human body without expression, without character, always muscular details, without the animating breath of life; next Phidias and his pupils, who seized upon the *ensemble* and subordinated details to them. There, we have no need to analyse with the reasonings of philosophers, we contemplate, and we understand nature owes its charm to these accidents, which impede its regularity, and avoid too symmetrical repetitions.

Like the author, we prefer Phidias, and also what he says of the great artists who, religiously examining nature and life, force themselves to appreciate the products of creative thought, and especially study the signs by which the soul manifests itself in the smallest of its works. Only the artist should be very careful that all the points borrowed from nature, by which he reveals himself to the lesser minds of the ignorant, become easily intelligible to the brains of all, because the *vulgar only understand what they see;* for this reason the characteristics should be strongly indicated, exposed to broad daylight, and detached from all which can rival or obscure them.

The painters and sculptors beautify their reproduction of that which is; this is the idealization of nature.

The author of the "Athenian Discourses" uses the utmost emphasis to attack the equestrian statue of

Colleoni, both as regards outline and gait; we are compelled, if therein we recognise the lack of elegance, the thickness of the body, and the bad outlines of the limbs, from the point of view of hippic delineation, to affirm that M. Cherbuliez errs in criticising the gait so severely.

Let what he said be first transcribed, subsequently we will prove our assertion: "What is much more important for me here to emphasise is the contrast which the statue of Phidias offers to the majority of the equestrian groups of modern artists.

Having to carve in marble, or to cast in bronze, the statue of a captain or a king, they never failed to hoist their hero upon the back of a horse, and this, because it is apparently more agreeable to represent kings and captains on horseback, and that, in addition, the personage placed highest and farthest removed from the ground arouses the more respect. But, however, between the cavalier and his mount there is no concord, no agreement of lines or of movement; the horse is nothing but a pedestal, or the second storey of the sub-basement. I am not exaggerating, I defy you to point out many exceptions, and, leaving generalities, remember one of the most vaunted works of modern times, one of the master-pieces of the Renaissance, the famous equestrian statue of the General Bartholomew Colleoni of Bergamos, which decorates the place of the Church Zanipolus at Venice.

Vassari states that the seigniory having decided to raise this monument, entrusted the execution to Andreas Verocchio, the master of Perugini and of Leonardo, and a sculptor of the greatest renown; then, thinking better of it, only confided the horse to him, and the General was assigned to Vellano of Pedua, pupil of Donna Tello. Verocchio, indignant at the affront put upon him, broke the head and legs of his horse, and went into voluntary exile, then returned, and saved himself from the senate by a witticism; the entire commission was then restored to him.

But speaking frankly, if the statue of Colleoni had been executed by the two sculptors, I do not think it would have lost much, for in that upon the square Zanipolo can be found neither harmony nor unity of

thought, and one cannot avoid believing that the Verocchio, who made the horse, was not the same who made the horseman. I have never been able to regard this over-vaunted horse without a sort of grief. Recollect the small magnificent head adjusted upon this enormous body, this heavy stomach, this massive croup, these flanks buried in fat. Assuredly this was not the horse which Xenophon loved, the animal of whom it could be said that it had a soul. This melancholy horse suffers from plethora, and has the gloomy languishing appearance imparted by painful digestion, accompanied by somnolency. There is no action, nothing to betoken life, added to which there is the fact that the position of its legs cannot be explained. It lifts the left anterior, folding it in an ugly manner, which induced Cicognara to declare that the horse had the appearance of wishing to descend from its pedestal, but in this point one can be re-assured. The three other legs are fixed on the soil, which they press with all their weight, more especially the right hind leg, which should accompany the movement, is the most backward of all, and skilful indeed would be he who could detach it from the pedestal . . . etc."

I will not here enter into the criticisms of the details of this statue, which, despite its defects and its massive appearance, is of a noble character. I will only contest the last lines of the preceding description by briefly recalling what occurs in the locomotion of the horse at a walking gait.

The sculptor of Colleoni has represented his horse resting upon the diagonal base, formed by the right anterior and posterior members; the right hind foot still rests upon the ground it is about to quit. Three feet touch the ground at a walk, representing the natural gait, rather than the exceptional. The right leg is therefore in a just movement; it is accurate to say that the fore limb, which in this case is elevated, should be less advanced and nearer to the ground; this is the especial reproach which can be made against the horse of Colleoni in explaining its gait; with the exception of this exaggeration, the appuis are accurate, both as to direction and print upon the soil; for self-conviction on

this point it will suffice to follow the trails of a horse moving at a tired pace upon a damp soil, and there is nothing to show that Verocchio had the idea of advancing the right leg in order to put his horse at the trot, which would have happened had he followed the advice of his critic.

The sculptor has far more slender resources than the draughtsman or the painter, and having neither sky nor earth at his disposal, should apply himself yet the more rigorously to the representation of a movement which may be regarded without fatigue even while frankly limited.

The statue of Gattamelata of Padua is under the same conditions of veracity, with the exception of the exaggeration of the form.

As we are speaking of Venice, the town of lagoons, in which there is not a single living horse, the preceding observations afford us an opportunity of adding that it appears that the idea of honouring great men there seemed to concentrate itself in the erection of equestrian statues; no other town presents so many examples upon tombs in the churches, and it appears that formerly there were yet more. I have copied some, they are all in the calm and regular gait of the walk.

Monumental as to their composition, these works, in gilded wood, have much analogy to one another.

In St. John and St. Paul we have the Count of Pitiliano, Nicolas Orsini, Republican General, 1519, sculptured by Lombardi; in the same church, Justinian Pompey, termed the Iron-armed, Republican General, killed at the assault of Gradisca, 1616, sculptured by Francis Terrilli; still in the same edifice, Leonardo de Prato, chevalier of Rhodes, Republican General, 1511, etc., etc.

At the Frari Church, Paolo Savelli, Roman Prince, died at Padua in 1405.

In the church of St. Marino the statue of the Republican General Thadeus Vulpio d'Imola, victor of Padua, who died in 1534.

All these statues, I repeat, are at the same gait, namely, at the walk and on the diagonal *appui*, the third foot of the horse being yet posed upon the ground.

absolutely like that of Colleoni, with less exaggeration in the elevated member.

Why doubt the intention of truthful reproduction by the artists of the epoch because they seized upon the truth of the flight, an intention which betrays itself in a yet more prominent manner in the palaces of the doges? The first pillar of the square of St. Mark has upon its ornamental capitol a warrior upon horseback, before whom a woman kneels; this and the cavalier have for support the convex portion of a leaf, folded upon itself (fig. 42). Upon a pediment so inconvenient for the fixing of the three feet of the horse the artist might have considerably diminished his base by making the two feet diagonally elevated by an equal effort, as in the trot, a gait at our epoch, still usually devoted to the representation of the walk. But he had seen with artless accuracy; he had reproduced with artless justice. His horse is perfectly posed, either for slowly continuing or for backing, if the obstacle, which is in front, opposes its progression.

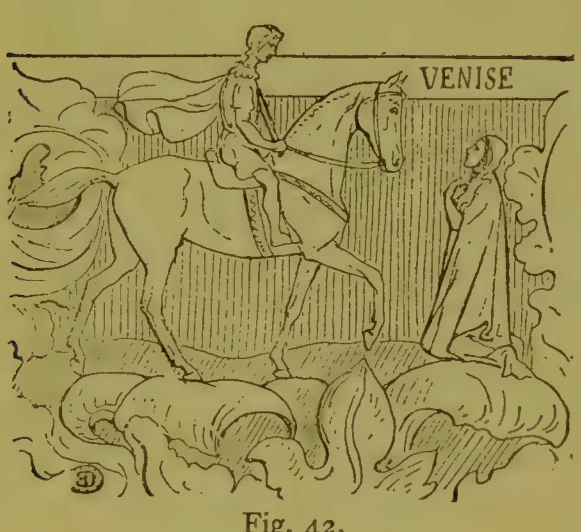


Fig. 42.

The sculptor, in order to be conscientious, has paid no attention to difficulty, as becomes markedly evident when regarding the constraint which he must have imposed upon himself in order to arrive at his object, compelling himself to hold the group upon a curved line.

Leonardo de Vinci was said to appropriate each species of drawing of the nature of the represented subject, and recommended the study of animals according to their habits.

Raphael, who idealising so beautifully the human type, paid no attention to the animal kingdom, which he interpreted with coarse lines. This appears the more

surprising, because, when his composition necessitated a horse he never erred as to the shade of its coat, producing the coloured effect necessary to his composition.

To Ingres, drawing was the *probity of Art*. Very realistic in the presence of Nature, he knew how to draw from her and from himself for the use of others, the elevated side, often veiled in the figure by *banal ensemble*. The thought of the artist seized the unity of this whole whilst assisting himself with its particular sentiment and his own knowledge. His work was correct and beautiful. His style possessed ideality with proportions and harmony. In fact, he caused the true form to appeal to the senses and to the imagination by rendering it perfect and beautiful.

CHAPTER X.

THE BAS-RELIEFS OF THE PARTHENON.

It is a very important fact that there exists no trace of harness or bridle upon the horses sculptured in the Parthenon. Nevertheless, the movements of the animals, the attitudes of the riders, and the positions of their right hands, usually indicate that the mouth of the horse was in communication with the rider, whose elbow is bent to confirm this motion. Possibly because of the height at which these bas-reliefs were found the artist considered a detail useless, which was sufficiently emphasized by the mass of the motion, and which the harmony of this magnificent whole could well dispense with.

Champollion the younger is of opinion that all this work was covered with an artificial coat of many colours. According to him, as architecture was painted so were the bas-reliefs of the Parthenon painted. There is nothing to forbid the supposition that the bridles and reins were metallic, and that the personages had a lightly-tinted set-off as back-ground, but without the accentuated shades of the middle ages, the discordant tones of which injure monumental sculpture. I, however, believe that many artists will agree with the opinion of Bernardin de Saint Pierre, who, in his "Studies of Nature," thus expressed himself with reference to this dissonance of colour laid on the form: "Painting is fairly successful in rendering the colours of the face, and sculpture in the expression of the forms; but if it be desired to unite the harmony of colours and forms in a single bust, this work will be very inferior to a simple picture or a simple statue, because therein are encountered the especial dissonances of colour and form, and their general dissonance is more marked. If to them be joined the

harmonies of movements, as in automatons, the cacophony will only be swelled."

It may be said of the horses of the Parthenon that they possess style and truth. No other sculpture has so nearly approached the natural form or the research of the masses which Nature gives under the impulsion of muscles, the rectitude of the shape of the members and the veracity of the lines which form their limitations.

Phidias sacrificed to the prejudices of his epoch by diminishing the stature of his horses, but he never committed the error of endeavouring to add to their nobility by falsifying the principles of their structure.

It is, however, a fault not to escape from the routine of a tradition. At our epoch Raphael would be at the head of those who deliberately neglect the study of animals, for the purpose of substituting for the true animated being, an attitude betraying a likeness to the human expression. Leonardo da Vinci himself, who so constantly recommended the study of animals, was not exempt from this error, any more than was Rubens, or so many others, without even excepting Van der Meulen.

In the bas-reliefs of the Parthenon it is easy to discover the marked predilection of Phidias for all that had reference to the horse, not only because the cavalry was the favourite and most formidable army of the Athenians, but also because this kind of reproduction gratified the taste of the sculptors commissioned to compose the immense work, with the greater part of which we are acquainted.

Despite some anatomical faults, easy to discern, the sculptures of this statuary offer magnificent instruction, and at times a too severe censure has been measured to this monumental work.

The absence of bridles has also furnished occasion for various interpretations. I am only desirous of quoting one, extracted from an English book, "The Horse," by William Youatt. With reference to the horses of Phidias, of which the criticisms of the shoulders and the brevity of the neck appears to me very sensible, the learned English hippologist writes :—"These animals remind us of some of the present heavy breeds. They have the

beauties and the defects of several of our Holstein breeds. They are high, but perhaps heavy in action, courageous, full of fire and passably proud. They exhibit the germs of future ameliorations, and, taken as a whole, may be regarded with considerable pleasure when it is recollected that these are the horses of two thousand three hundred years ago.

"Art has done much for the horse since that time, but the deportment and face of the human being was then already perfect. These riders have not even a switch with which to guide the animal, but they held the hair of the mane in the left hand, and evidently directed the horse by pulling the mane or pressing the neck with the right hand, placed a little higher than the other."

This last opinion of the English author is inadmissible. How could its application be carried as far as the direction of the horse in the midst of combats in the different operations of war and of pursuit.

It would be absurd to hope to conduct a horse solely by pressure of the mane. This supposition suffers self-destruction, because observation of these animals nullifies this method of direction, for the mane was generally cropped in a brush, and besides, in these same bas-reliefs, the conductors of the chariots have free use of both arms and hands, which indicates the action produced by the tension of reins intended to conduct the horses. The fingers of the riders are closed with a gesture which grasps the reins that are imaginary to us.

The ancients, wonderful observers of the harmony of forms, were thoroughly capable of extracting the service of which horses were capable, according to the regions accustomed to produce a long race or a gathered up and more amenable animal.

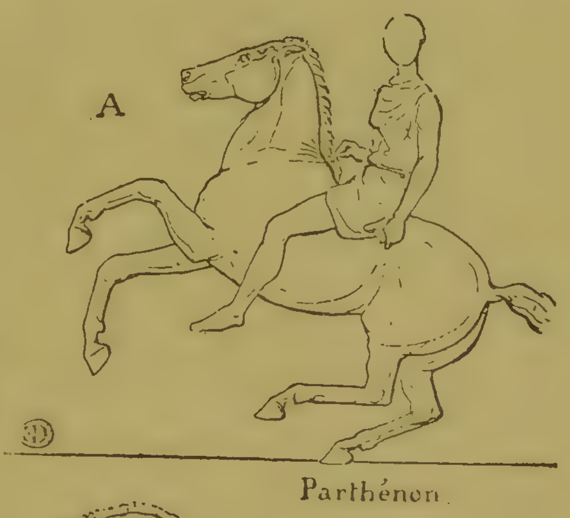
I was struck, during my sojurn in Persia, by finding vivid traces of the animals mentioned in the records of the expeditions of Alexander the Great in Asia. I have verified, by ancient authors, that especially in the neighbourhood of the Caspian Sea, the form is persistently maintained and answers to indications recalling 330 years B.C.

It is thus that these grand and long horses, destined to drag the chariots, could be even now recruited among

the Turcomans to the east of the Caspian Sea, among the ancient Parthians and Hyrcanians.

To the west of this inland sea, on the contrary, the Karabagh, to the north of Media, produces a lively and short horse with brilliant and metallic reflections, which once served as the light cavalry, and might well be the father of the Arab race, as well as of the tough mounts of the Cossacks on the contemporary expeditionary line in Georgia and Caucasus.

In Greece, these bas-reliefs of Phidias attest this diversity of appropriation of animals to special functions. The chariots of the processions of the Parthenians, decorating the southern frieze, are all drawn by horses much longer than those of the numerous riders which escort them at a gallop, rearing and pawing the ground.



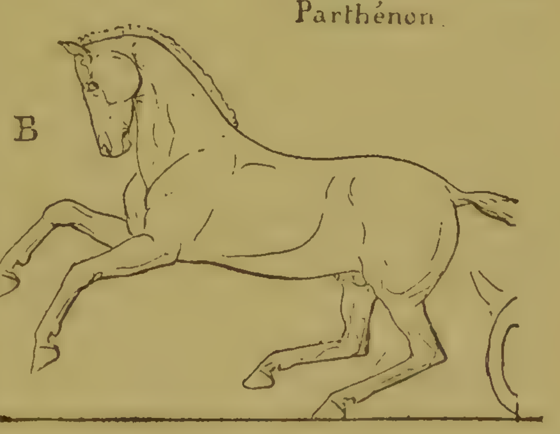


Fig. 43.

The example drawn from the Parthenon (fig. 43) will emphasize my observations. In addition, we see in these two sculptures the very exact reproductions of the first times of the gallop. The cavalier (A) is at a gallop on the left. The horse of the chariot (B) is a specimen of the same gait on the right.

I had noticed in Greece the very few of these hippic recollections which remained in place. I subsequently examined the interesting collection of the works of Phidias remade in England, with the great number of

originals possessed by that country, when on my return to France in 1861, on attentively studying the riches of the Campana collection, exhibited at the Palais de l'Industrie, I was impressed by seeing in upper Italy that the *observations* made in Greece and Asia with reference to the utilisation of short horses, were confirmed in a yet more apparent manner upon a great number of decorative vases representing riders and chariots. The more accurate the draughtsmanship, the more apparent was the difference between the forms of the ridden horses and those of the harnessed animals.

We were confronted by relics found in the Etruscan graves in the lowest zone of the three seats of sepultures of an antiquity far more remote than the campaigns of Alexander in Asia or the Grecian sculptures of Phidias.

Nevertheless, from the artistic point of view, there was every conducive for the Etruscan designer to neglect this distinction between the animals; the decorator, being obliged to cover the rounded surface of vases with graceful figures, could have rendered his subject more interesting, and above all more complete, if he had united under one view the whole of the harnessed horses and the chariot; but he sacrificed to truth by scrupulously rendering the elongated form ofthe draught horses of his time, whilst the environing warriors rode short horses.

It is in the study of what arrests the eye that the artist has need of direction. He must judge animals by their exterior, and for that anatomical studies will not suffice. He must, in addition, be thoroughly acquainted with the regular conformation of proportions, of equilibrium, and especially of gaits.

The last studies which I have just made in Italy upon the ancient productions prove to me that our predecessors, however little solicitous of form, either through ignorance or by intention, nevertheless managed naively to express life. I have seen at Pisa, in the paintings of the pupils of Giotto, horses perfectly poised at the walk, or backing; this, too, in the frescoes of Organa, etc.

I have made the same observation on the sarcophagi and in the sculptures of Florence and Venice, which

prove it to be possible. Our epoch has greater knowledge and better instruction, therefore it is permissible to demand more serious productions from artists who are on the same level of attaining theoretical knowledge of what their predecessors reproduced accurately, now and again, in an unconscious manner.

CHAPTER XI.

EXAMINATION OF THE WORKS OF SOME PAINTERS OF HORSES.

I shall rapidly review some artists whose brushes have been specially devoted to the reproduction of horses. In order to avoid too distant an antiquity, I will commence with Charles Parrocel (1688-1752), son of a battle painter. He served in the cavalry, where his taste for horses made him desirous of daily contact with the object of his studies.

Inspection of his work is conducive to regret that he did not profit more by the living model in order to avoid the errors of the painters of horses, who were his predecessors. It was unnecessary to draw from nature to give an amplitude to the croup of his animals as extravagant as any of the compositions of his artistic ancestors.

Parrocel absolutely neglected the anatomical portion, the heads being especially ill-constructed, and he made no advance on the equestrian fashion bequeathed him by the spiritedness of Bourguignon and the delicacy of Van der Meulen, which does not prevent the recognition of animated military compositions in his work as well as considerable talent as colourist.

The equestrian portrait of young Louis XV., now in the museum of Versailles, ought to have been a conscientious labour on the part of the painter; yet the horse is thoroughly deformed and has all the defects of the one given (in fig. 44), a copy taken from an etching by Parrocel, ornamenting *the Treatise on Equitation*, (cavalry school of la Guérinière).

Carl Vernet (1758-1835), born a little after the demise of Parrocel, was a brilliant cavalier and a man of the world, moving in the highest society. He won the prize

for painting in 1782, which caused him to take up his residence in Rome, where he was only partially satisfied with the manner in which the old masters treated animals, with one conventional model. Vernet made an energetic reaction against this heavy and thick horse, which was also sanctioned in France by Lebrun, Van der Meulen and Casanova, who always drew horses over-burdened with flesh. Vernet intentionally departed from old traditions, always allowing himself to be dragged into the delineation of a horse of elegant formation, but often lanky, supported by long and slender members.

In all his works, his horses are invariably at a trot when representing a walk. These horses kick in leaping



Fig. 44.

obstacles, vigorously indicating the divergence of the four members; all, when galloping, hold the toes of the posterior members fixed to the ground (see fig. 14); he is also to be rebuked for having given too long legs to his riders, which considerably reduces the capacities of the thorax of their horses already emaciated by a rather accentuated muscular plexus.

The *Rider* by Parrocel, of which we here give a copy, presents this disproportion of the man with reference to his horse, his leg exceeding the stomach by more than

double what is possible for a man of high stature. We have ascertained that the leg of a man of 1 meter 80 centimeters, that is to say a tall man, with long stirrups under the stomach of an animal of 60 centimeters, only exceeds by the height of the instep. The stirrup is but rarely found entirely detached from the profile of the inferior curve of the abdomen (see in fig. 44 the representation of the error pointed out).

The painter Gros, pupil of David, had the independence to quit the mythological scenes of the Greeks and Romans. Military subjects were not lacking to display his talent as a great artist.

Having early commenced to draw horses, he especially painted the beautiful Arab horse, with brilliant and soft silky coat, of which the more natural aspect was shown, a little later, by Horace Vernet in his fine series of African pictures.

Gros had already all the qualities of a talent which really came up to that of the most illustrious of his time, and was labouring far from the beaten tracks, when, at Rouen, was born Gericault who, whilst having a profound admiration for this master, constrained himself to look at nature from a yet bolder and more realistic point of view.

From the time of his admission as a student his passion for the horse dominated everything; the youth, hardly free from scholastic studies, presented himself before Carl Vernet, the renowned equestrian painter. His early experience quickly showed him the erroneous interpretation under which his master only admitted the dryness of a single horse model through pretext of elegance.

Gericault felt himself naturally disposed towards the reproduction of a vigorous type possessed of the breadth necessary for violent efforts; it was thus that he drew the horse in numerous sketches until his visit to England; there he learnt to slightly elongate the form and to draw the withers in a less exaggerated manner, without any detriment to the inherent qualities; the horse was always animated, courageous and ready for the struggle.

Now that I have shown Gericault in all his artistic energy for the sake of his merit it is necessary to analyse

some specimens, his work occupying so prominent a position as the transition between the conventionalities of his predecessors and the reality which is now required.

I find the following lines in an interesting biography of the artist :—"Oh! that by a miracle we might see his horses descend from their frames or become detached from the lithographic stone and accomplish the motion commenced and uninterruptedly finish their gait upon the nervous elasticity of their hocks.

"I have been witness of the hesitation which sometimes possessed the mind of the spectator when looking at the works of Gericault; there is indecision as to the object he himself proposed to attain. The question is put to one's self: did he desire to astonish or did he only wish to portray? It is such an hesitation as this which I should be happy to relieve. Apt to feel every violent motion, the artist was also exceptionally apt to render it. Few masters, even among the greatest, have known how to avoid preparation for the *mise en scene;* in Gericault, from the madness of the Medusa to the least picturesque of his studies of a horse, the action not only takes place at the very moment at which the attention is directed, but it began previously and will subsequently continue; its duration is whilst it is regarded. I will not even swear, after close and reiterated scrutiny, to the impossibility of finding the preceding movement, the preceding effect. I will absolutely affirm the divination of that which will follow. What is even yet more astonishing in the Norman artist is his ability to express nature with veracity and exactitude and yet to impart to his interpretations something in addition and beyond, which is not nature. His profound knowledge permitted self-abandonment to his natural exaltation and attainment of the translation of natural objections of his own notions by intuition and obedience to nothing but his own phantasy."

It is in the calm motion that appreciation of the mechanism regulating the progression of the members is possible. The progress made in the science of locomotion is an assistance to accurate inspection.

Gericault ignored a theory he could never have learnt, and his own observations, however thoroughly exercised,

could not supply the deficiency. For a long while yet much effort must be given to snatch such fugitive detail, being still unguided by knowledge of what must occur.

The author of the biography deceives himself when he affirms the possibility of divination in the drawings of Gericault of the preceding and succeeding movements. I desire no better proof than the lithograph entitled *The Horse Dealer*, leading five vigorous draught horses ; the intention of the artist is to make them move slowly on rough ground. The position of the members do not answer to the present action, to that which is passed nor to that which will follow. The dotted rectification of the most prominent animal (fig. 45) re-establishes the lateral *appui* which is the only one suited to the position of its posterior.

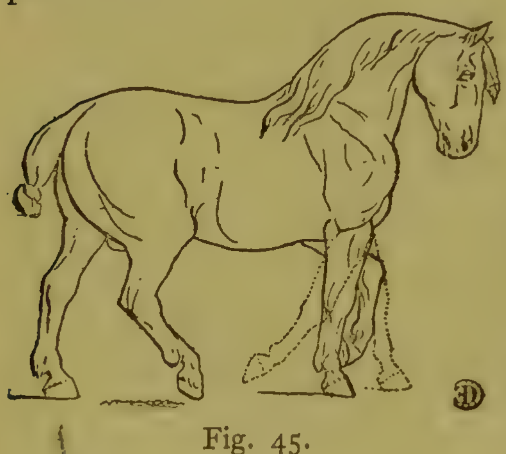


Fig. 45.

In another lithograph, entitled *The Team of an English Collier*, five big horses, of the same nature as those of the preceding plate, descend an inclined plane. They are all at the true diagonal *appui*, although the space between the feet adhering to the ground is too great, which renders difficult the obligation of exactly indicating the length of the step which will follow, even whilst admitting that in the descent, the step is rather longer than in the ascent as has been already explained.

I will, however, make the restriction that each animal taken alone is more indicative of the hesitation of a backing-motion than that of a forward progression.

An unpublished drawing in China ink, by Gericault, in one of the rooms of the exhibition of *l'Ecole des beaux-arts*, represents a man riding a horse which is rearing (fig. 46). I would point out that if the rider ought to unite himself to the movements of the animal, it is permissible for him to thwart the opposition of the horse which rears to rid itself of the weight which incommodes it.

In the drawing of Gericault, the man, both by his position to the rear and his manner of handling the bridle,

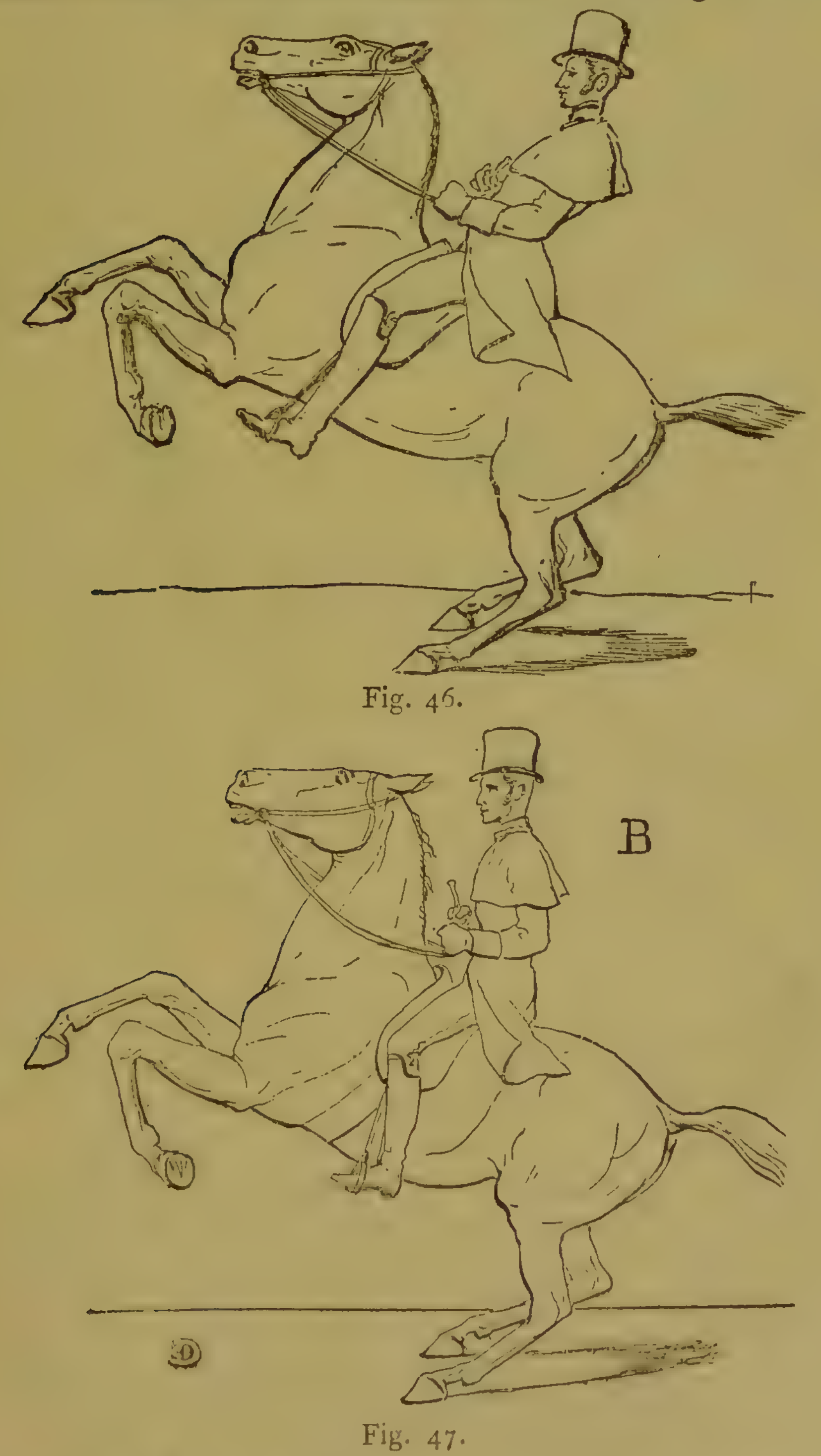


Fig. 46.

Fig. 47.

will help to throw the horse completely backward. In contradistinction to this pose, I offer that of rider B

(fig. 47) who, without fatiguing the bit, will cause the horse to revert to its natural *appuis* by paralysing its opposition through his own attitude.

Although a high rather than a broad chest is preferable in a saddle-horse, in the work of Gericault, all the horses have the humerus, or arm, exceeding the natural limitations as to height.

The specimen of the drawing of this master just given, in this respect closely approaches the horses said to be *of Marly*, which rear at the entrance of the Champs-Elysées, as well as the horses of the Parthenon.

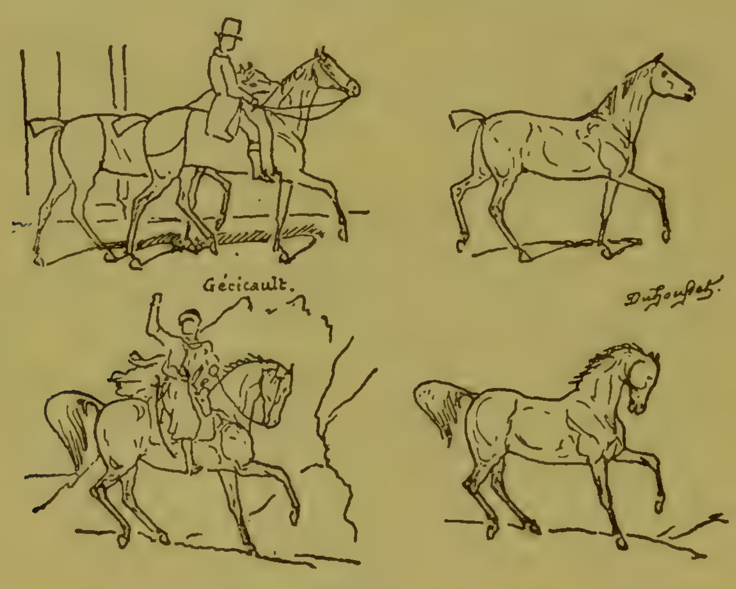


Fig. 48.

In the subject which follows, the horse, which is ridden, is at the period of the *appui* of the trot. The intention of the draughtsman (fig. 48) has been to place both the animals at a walk. With this object it would have been necessary to invert the pose of the hind limbs of the first, as shown in the rectification; it would then have been upon the left diagonal *appui*, as would have been the second, after changing the movement of the anterior members.

The horse of the Giaour (second subject of fig. 48), only rests upon one side. What renders its equilibrium the more difficult is the fact of being upon a slope and apparently but little docile; to make it solid, it is necessary to give it a right diagonal base, and to cause it

to lift the left fore-member, whilst the right presses heavily upon the ground.

Gericault has been a reformer, energetically inveighing against routine, in his handsome series of hippic lithographs. The narration of his life shows that he was but little understood by the publishers of the prints of his period, and yet they were the work of a good draughtsman; with the scientific resources now possessed and his own love of truth, he would undoubtedly have pursued his studies in research of absolutely accurate picturesque movement.



Fig. 49.

In termination, I will analyse the works of some very well known artists as an application of the principles enunciated in the course of this work.

I will commence with the popular engraving of the *Dead Trumpeter*, by Horace Vernet. It is clear that the horse leaves much to be desired according to the laws

governing locomotion and arrestation ; in fact, the two feet which are very close together upon the lateral *appui*, could not support the weight, especially if the horse began to back, as would appear necessary to avoid trampling upon the man (fig. 49).

The horse must have advanced with precaution, and

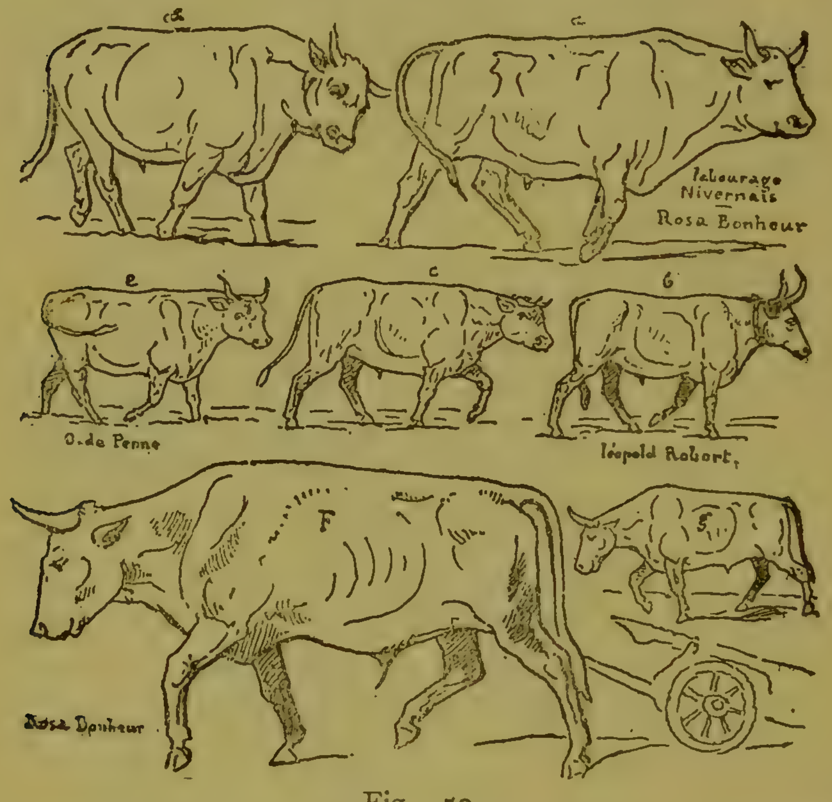


Fig. 50.

it was only when it felt itself thoroughly enthralled that it vigorously curbed its neck and bent the head in order to understand the immobility of its master.

It is therefore necessary to frankly give it the left diagonal *appui*, so that the body can advance or draw back with facility. I indicate this modification in the little sketch at the left of that by the artist, whose drawing would have been equally correct if he had lifted the right anterior member of the horse, without meddling with the posterior members, and so have constituted the right diagonal *appui*.

The second sketch from Horace Vernet (fig. 49) is taken from the picture of the *Smalah of Abd-el-Kader:* this is the mare on the extreme right; an Arab chief

pulls it violently by the ear and bridle, whilst a negro endeavours to put a saddle on its back. The animal has but one foot which really rests on the ground; this is not a walk for the members are at the gait of a trot; with this development it would forcibly carry off the rider endeavouring to drag it. The pose is especially false, because of the effort made by the master to excite a movement already too active; to portray the elongated step it would be necessary, whilst altering the drawing but very slightly, to cause the left fore member and the right hind leg diagonally opposed to set down, as shown in the rectification at the side (left diagonal base).

In the *Labourage nivernais* of Madame Rosa Bonheur, the first ox *a*, who appears to be drawing energetically has not the members placed for the accomplishment of the effort indicated by the forward inclination of the head and neck; the left diagonal base should be nearer to produce the effect. If it be desirable to leave the hind-quarters of the animal as drawn, it must be modified as in *b*, after the picture by Leopold Roberts (fig. 50).

In the exhibition of 1872, M. Isidore Bonheur exhibited a Roman cow in bronze, perfectly at a walking gait. A fore foot had just left its tract to the hind foot of the same side, this latter, posed at equal distance from the two lateral supports, commenced the diagonal *appui*, which, with the fore member, will make the base upon which the animal will progress, so soon as the hind foot still adherent to the ground has operated its raising up.

The ox *a* must choose between *b* and *c*, which are the only *appuis* of locomotion; the second ox of the *Labourage nivernais*, *d* to be exact, would require to have its members placed like those of which the sketch is given at *e*, from a picture by M. O. de Penne, representing a perfectly exact team.

The *ox* F is at a trot for ploughing, it should be placed as in *g* for the accomplishment of this slow labour (fig. 50).

It is long since Meissonier first ventured to draw the horse with calm and just movements, to which the eye was not accustomed, I give, as example, the sketch of *Napoleon* from the remarkable picture of the *Retreat of*

1814 (fig. 51). There can be no more fitting method of terminating this work than by expressing a wish that the



Fig. 51.

example of Meissonier may be followed, and I feel happy in being able to lean upon so authoritative a testimony.

E. DUHOUSSET.


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